

Mona Vale Upgrade East:

Landscape Character, Visual Impact Assessment + Urban Design Study

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Project:
Mona Vale Road Upgrade

Project number:
SYU-004099

Document Name:
Mona Vale Road Upgrade East: Landscape Character Visual Impact Assessment + Urban Design Concept

Client:
Roads and Maritime Services

Prepared by:
HBO+EMTB Urban and Landscape Design

Issue	Date	Revision Description	Author	Check	Approval
A	27.11.14	Draft with Visual Impact Assessment	JK	GB	GB
B	16.01.15	Final Draft	JK/SL	MS	GB
C	20.01.15	Final Draft	JK/SL/MS	MS	MS
D	11.03.15	Final	MS/AB	AB	AB
E	23.04.15	Final	MS/AB	AB	AB

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Executive Summary

Roads and Maritime Services (RMS) are proposing to widen and upgrade Mona Vale Road, in two distinct 3.2km sections, between Terrey Hills in the west and Mona Vale in the east. This report addresses the proposed eastern section, from Manor Road/Lane Cove Road, Ingleside to Foley Street, Mona Vale.

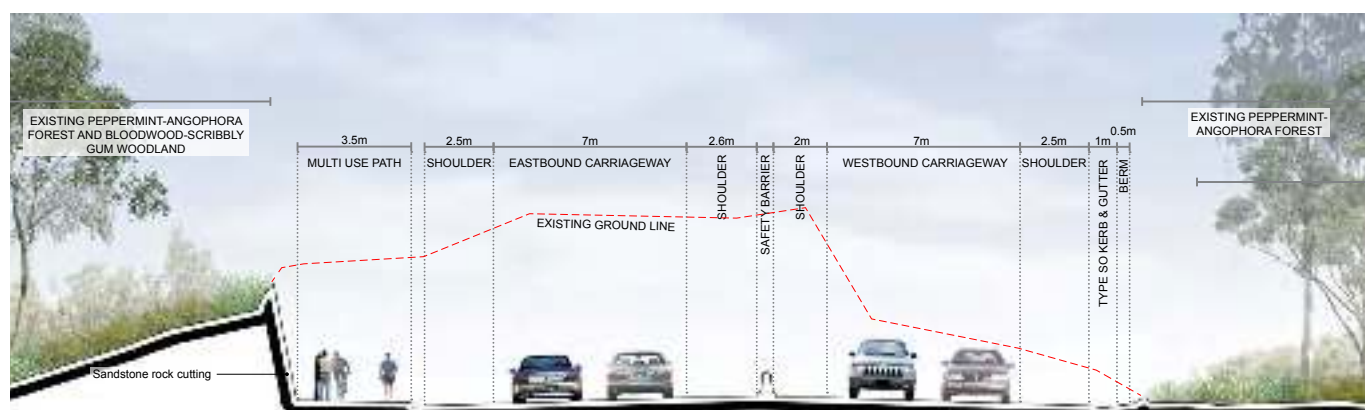
The report details the objectives of the project and articulates the governing urban design vision, namely, that the road is to provide a well integrated engineering and urban design outcome. Specifically, it should:

- + improve safety and usability,
- + fit sensitively into the built, natural and social/community environment through which it travels,
- + contribute to accessibility and connectivity for the people of the local community and the wider region,
- + contribute positively to the overall public domain of the local area, and
- + facilitate urban development and revitalisation.

The report presents a contextual analysis of the proposed alignment. This describes the role of the road corridor in the broader region and the particular physical characteristics of the study area that present a range of design challenges. The constraints include the steep and rocky topography of the ridgeline and the Warriewood Escarpment, extensive rock cuttings and sensitive bushland areas of high ecological value that occur adjacent to the road, such as the Katanandra Bushland Sanctuary and parts of the Ingleside Chase Reserve. As the road approaches Mona Vale a mix of more urban land uses prevail, including commercial and recreational areas and the Mona Vale General Cemetery.

A summary of issues and opportunities that the upgrade presents is included in the report.

Eight landscape character zones are identified and the visual impact of the proposed alignment and road widening on the prevailing landscape character is assessed at thirty viewpoints along the alignment. This analysis, in turn, informs the urban design strategy and the concept design articulated in sections 5 and 6 of the report, and more specifically, the mitigation recommendations tabulated in section 7.



One of the significant features of the widened road corridor is the use of cuttings in certain locations on the edge of the alignment.

The urban design strategy for the road seeks to integrate the widened road sensitively into the Hawkesbury sandstone bush landscape as well as the more peri-urban and urban areas of Ingleside and Mona Vale. It aims to reveal and reinforce the attributes of the natural setting while introducing new structures and elements where needed. The concept design seeks to mitigate the visual impact of the road where it travels close to urban areas, roadside and cultural landmarks and significant natural features.

The concept design is described serially in five zones with a single plan illustrating the proposal in each zone. Two cross-sections are included for each zone to illustrate areas where the change envisaged is relatively significant or where major new elements or structures are proposed. Details of proposed finishes to retaining walls are included as are perspective views of the proposed Truck Arrestor Bed at chainage 2200 and the Mona Vale Entry Avenue Planting between Daydream Street and Ponderosa Parade in Mona Vale.

The Mona Vale Road Upgrade East Landscape Character, Visual Impact Assessment and Urban Design Study demonstrates that by applying a considered urban design strategy the project can successfully manage and mitigate the landscape character and visual impacts of the widening and upgrade. The urban design strategy and the range of mitigation measures may yet be extended and/or refined through the design process and during consultation with affected landowners. Throughout, the aspiration should remain to create an attractive, functional road corridor that sympathetically plays to the distinctive strengths of this particular Sydney landscape.



+ 1.0 Introduction

1.1 Purpose

This report presents a Landscape Character, Visual Impact Assessment and Urban Design Study for the proposed Mona Vale Road East Upgrade: Manor Road/Lane Cove Road, Ingleside to Foley Street Mona Vale, ('The Proposal'). It has been prepared for Roads and Maritime Services by HBO+EMTB Urban and Landscape Design Pty Ltd.

The purpose of the report is to:

- + Inform the Review of Environmental Factors (REF) being prepared by others for the proposal
- + Identify and document the visual and landscape character issues and opportunities in the Study Area
- + Assist in achieving the integration of urban and engineering design
- + Contribute to the concept development process through avoidance, or reduction of, any negative urban design impacts, where possible.

1.2 Context

1.2.1 Regional Context

Mona Vale Road provides a major east/west link between Pittwater Road at Mona Vale and the Pacific Highway at Pymble. Mona Vale Road provides a strategic route for the suburban, commercial and industrial areas of the Northern Beaches and serves an expanding population of about 80,000 people and about 34,000 jobs (RTA, 2009).

The regional context of the road is shown below.



Regional Context Plan

1.2.2 Project Context

Most of Mona Vale Road has been upgraded to either four lanes (two lanes in each direction) or six lanes (three lanes in each direction) with a posted speed limit of between 60km/h and 90km/h. However, two sections of Mona Vale Road are still two lanes only - one lane in each direction - with a posted speed limit of 70km/h. The location of the proposed alignment of these sections (Mona Vale Road Upgrade East and West) is shown below in the project location plan.

With high and increasing volumes of traffic using the arterial road, these sections of Mona Vale Road experience traffic congestion and significant delays, and they have a relatively high rate of motor vehicle accidents, including some recent fatalities. The road is also used heavily by recreational cyclists. The existing two lane road has a steep vertical alignment and there are no overtaking opportunities between Kanangara Road, Terrey Hills and the Baha'i Temple, Ingleside and between Manor Road, Ingleside and Foley Street, Mona Vale. There are a series of reasons why traffic congestion occurs along this stretch of Mona Vale Road, namely:

- + High and increasing traffic volumes
- + 'Bottlenecking' caused by traffic merging from two lanes into single lanes at either end of the proposed upgrade
- + Heavy vehicles travelling at below the posted speed as they climb or descend the steep hills in the proposal area.

A significant proportion of the eastern section of the proposed upgrade runs through more urbanised conditions than the western section. Although the residential suburb of Terrey Hills occurs at the beginning of the western section, the adjacent land uses quickly change to bushland, National Park and quasi-rural residential subdivisions. One parcel of publicly owned land on the southern side of the alignment is used for a waste disposal/recovery facility. At the eastern most part of the proposed western upgrade is the Baha'i Temple which is set in relatively open landscaped grounds. The eastern section of the proposed upgrade runs in part through bushland at its western extreme but as the road travels down the Warriewood escarpment, on its approach to Mona Vale, this landscape soon gives way to a mix of residential, light industrial, commercial and recreational land uses. The Mona Vale cemetery also fronts on to the road.

Roads and Maritime Services are proposing to upgrade these two sections of Mona Vale Road from two to four lanes between Terrey Hills and Mona Vale. The upgrade is being planned in three stages as follows:

Stage 1 – Mona Vale Road East interim works

This is an RMS 'pinch point' project providing a minor upgrade of the intersection of Mona Vale Road with Ponderosa Parade and Samuel Street. The widening work provides two lanes westbound from Foley Street through the Ponderosa Parade roundabout and two lanes eastbound.

Stage 2 – Mona Vale Road East Upgrade

The upgrade of 3.2km of Mona Vale Road from Manor Road/Lane Cove Road, Ingleside to Foley Street, Mona Vale.

Stage 3 - Mona Vale Road West Upgrade

The upgrade of 3.2km of Mona Vale Road from McCarrs Creek Road, Terrey Hills to Powder Works Road, Ingleside.

The design of Stages 2 & 3 will follow a consistent design language to be established for the corridor. An urban design strategy has been developed for both sections with a set of principles and objectives common to both upgrades. Separate reports are being prepared for each section to align with the proposed construction programme. Mona Vale Road East is proposed to be constructed first, followed by Mona Vale Road West.



Location Plan

1.3 The Study Area

Mona Vale Road Upgrade (East)

The Mona Vale Road East section is a two lane, single carriageway road that runs along then down the Warriewood escarpment from Manor Road, east of Powder Works Road, to the junction between Foley Street and Mona Vale Road. The western part of the upgrade area is primarily in a bushland setting with Katandra Bushland Sanctuary located on the northern side of Mona Vale Road and part of Ingleside Chase Reserve on the southern side. The eastern section of the proposal is more urbanised and is characterised by adjacent residential development, light industry, commercial land uses, recreational areas and the Mona Vale General Cemetery. The proposal area is within the Narrabeen Lagoon Catchment and several drainage lines flow beneath Mona Vale Road in a south easterly direction, with Narrabeen Creek the most prominent. This section of Mona Vale Road links the communities of Ingleside, Eleanora Heights and Warriewood to Mona Vale.

1.4 The Proposal Objectives

Key Roads and Maritime Services objectives of the Mona Vale Road Upgrade are to:

- + Improve traffic capacity and efficiency for road users
- + Improve road safety by providing suitable shoulders for on-road cyclist use and vehicle breakdowns
- + Consider how options could be adapted to integrate with potential future upgrades and adjacent development
- + Consider the most effective methods of construction in the tight corridor
- + Minimise impacts on the environment, threatened species and heritage sites
- + Ensure compatibility with adjacent sections of Mona Vale Road.

1.5 Study Methodology

The study follows an iterative process where key issues, constraints and mitigations relating to the landscape character and visual assessment of the alignment are integrated into the engineering and urban and landscape concept design. The study comprises the following key components:

- + Contextual Analysis
- + Landscape Character Assessment
- + Visual Impact Assessment
- + Proposed Urban Design Strategy
- + Urban and Landscape Concept Design
- + Mitigation Recommendations.

The methodology used in this Landscape Character and Visual Impact Assessment is based on the Roads and Maritime Service *Environmental Impact Assessment Guidance Note (2012): Guidelines for landscape character and visual impact assessment*. The methodology in the guidance note has been modified to suit the characteristics and requirements of this particular proposal.

1.5.1 Contextual Analysis

A succinct summary is provided of the contextual analysis of the built, natural and community character, structure and functioning of the study area. This summary identifies issues and opportunities that have arisen from this analysis.

1.5.2 Landscape Character Assessment

This task involves photographing, mapping, understanding and describing the different landscape character zones in the Study Area, and determining and describing the capacity of these different zones to visually absorb the proposed upgrade. A landscape character zone is an area of distinct and consistent character and the impact of the proposed upgrade works within it may differ from the impact in another zone. Landscape character zones are mapped and described in Section 3.0.

Two primary factors are used to determine the impacts on any landscape character zone:

- + Sensitivity of the character zone.
- + Magnitude of the proposal in that zone.

The **sensitivity** of a landscape character zone is used in both Landscape Character Zone Impact Assessment and in the subsequent Visual Impact Assessment.

The Roads and Maritime Service Environmental Impact Assessment Guidance Note (2012) defines sensitivity as: *“The sensitivity of a landscape character zone or view and its capacity to absorb change. Combined with magnitude, sensitivity provides a measure of impact.”* (Roads and Maritime Service, EIA-N04, p.6).

It further states: *“Sensitivity refers to how sensitive the character of the setting is to the proposed change. For example a pristine natural environment will be more sensitive to change than an industrial area.”* (Roads and Maritime Service, EIA-N04, p.9).

The capacity to absorb development is primarily dependent on landform, vegetation cover and existing structures.

The more pristine the landscape, the greater the consequence of introducing new development and therefore the higher the sensitivity rating of that zone. Areas that have been modified for road widening would be ranked lower than (for example) areas of a National Park.

A precinct with a coherent character, for example a National Park with gently undulating topography, would be more visually sensitive to new development than a precinct whose topography and natural and/or built character has greater variety.

The **magnitude** of a proposal in a landscape character zone depends firstly on the scope of that proposal. Widening an existing road at ground level would typically have a lesser magnitude than a new elevated road on a viaduct. The location of the proposal in relation to the character zone also influences magnitude. For example, a proposal which passes through the middle of a character zone would have greater magnitude than one which skirts the edge of a zone. Six categories are used in ranking the magnitude of a proposal, ranging from negligible to high.

The **Landscape Character Zone Impact** is determined using the matrix shown in Table 1.5.2. Rankings for sensitivity and magnitude are combined to generate the impact in the body of the table.

		Magnitude			
		HIGH	MODERATE	LOW	NEGLIGIBLE
Sensitivity	HIGH	HIGH IMPACT	MODERATE-HIGH	MODERATE	NEGLIGIBLE
	MODERATE	MODERATE-HIGH	MODERATE	LOW - MODERATE	NEGLIGIBLE
	LOW	MODERATE	LOW - MODERATE	LOW IMPACT	NEGLIGIBLE
	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE

Table 1.5.2. Landscape Character and Visual Impact Grading Matrix, Roads and Maritime Service, (2013)

It is important to note that Landscape Character Zone Impact Assessment has to do with the way and extent to which a proposal alters the perceived nature, or sense of place, of a zone. Change to the character of a zone would be felt and understood even when a zone extends beyond the immediate Study Area.

1.5.3 Visual Impact Assessment

To assess the likely visual impact of the proposal from key viewpoints, the following tasks were completed:

- + A desktop analysis to ascertain the visual catchment of the proposal within the Study Area, as well as identifying potential receptors of the visual impact - determined through topographic analysis and using Google Maps. This provides the basis for the establishment of the Visual Envelope Map (VEM), view corridors, and key viewpoints.
- + An on-site field inspection to confirm the visual catchment, gain an understanding of the proposal within the context of the study area and identify and confirm key viewpoints and the sensitivity of potential visual receptors. This included site photography that was later used in the viewpoint analysis.
- + The sensitivity rating of each viewpoint is based on the sensitivity ranking of the landscape character zone in which it is located.
- + The magnitude is measured as the degree of change the particular view undergoes as a result of the proposed development. Relative to the existing condition, magnitude is ranked on a six point scale from negligible to high.
- + In a process similar to that used for landscape character zone impact assessment, the visual impact is assessed by combining the viewpoint sensitivity and the magnitude of the proposal as illustrated by the matrix in Table 1.4.2.

1.5.4 Proposed Urban Design Strategy

Development of an Urban Design Strategy that articulates a vision, principles and objectives to govern the further development of the design and that addresses the identified landscape character and visual impacts.

1.5.5 Urban and Landscape Concept Design

Development of a Concept Design proposal (by precinct) that is described in plans, sections/elevations, precedent photographs and other drawings, as appropriate.

1.5.6 Mitigation Recommendations

Recommendations are made for mitigation measures that might be adopted during the on-going development of the concept design to reduce, minimise or eliminate unwanted impacts.

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1.6 The Proposal

The proposed Mona Vale Road East Upgrade and widening will provide two lanes in each direction divided by a concrete median with a twin steel rail, modified “F” type barrier (from east of Manor Road in Ingleside to east of Daydream Street in Mona Vale) and a 3m wide shoulder to the edge of each carriageway.

At its western end, the upgrade is proposed to tie into the existing four lane, dual carriageway section of the road at the signalised intersection of Manor Road/Lane Cove Roads and Mona Vale Road. Initially, at this point, the road has a more open character with a few adjoining properties overlooking the junction. From here the widened road will generally follow the existing alignment with the widening largely occurring to the north of the current road resulting in a series of new rock cuttings will generally replicate existing roadside conditions. The Proposal is designed to widen these distinctive cuttings and to maintain existing views, where they occur, out to the Pacific Ocean.

As it travels east from Ingleside the road’s edges revert to bushland with these distinctive sandstone cuttings. A small number of residential properties occur adjacent to the road corridor but do not front onto Mona Vale Road and generally do not have access from it. The widening also results in a series of smaller battered embankments on both sides of the alignment in places where the adjacent ground is lower than the existing road. A retaining wall on the southern side of the road as it approaches Laurel Road East supports one of the few areas where the road is widened on that side.

The bend in the alignment at Laurel Road results in a substantial new stepped cutting with intermediate benching. This cut through escarpment begins the downward run toward Mona Vale. Short runs of retaining walls occur intermittently on either side of the alignment, interspersed with longer, tall cuttings and smaller areas of relatively flat adjacent ground.

The eastern section stretches from the western edge of the urban areas of Mona Vale (about 200m west of Boundary Street) to Foley Street in Mona Vale. It contrasts strongly with the western section due to its predominantly urban character. The gently undulating topography also contrasts with the steeper terrain to the west. From the base of the Warriewood Escarpment at Boundary Street, a final retaining wall occurs on the southern edge of the road as the topography runs further down to a low point at Ponderosa Parade.

The road straightens here to reveal the more urban roadside landscape of Mona Vale. A truck arrestor bed is proposed on the northern side of the road immediately before the cemetery. The widening claims a slither of land on the southern as well as northern side of the road as it continues to Ponderosa Parade. The final stretch of the widening to Foley Street occurs to the south of the current alignment.

As the road passes this more suburban, residential and commercial zone on both sides of the alignment, it still retains a generally “green” outlook. This landscape buffer is a mix of native and exotic species. Mature avenues of trees and some shrubby understorey, as well as grassed areas, form the northern edge. Landscaped earth mounding and more formal plantings run along the southern boundary. Key land uses that adjoin Mona Vale Road include the Mona Vale Cemetery and Pittwater RSL. Most residential properties have side or rear boundaries facing the road. However, between Emma Street and Foley Street they have street frontage and driveway access. The commercial area comprises large offices, light industrial units, retail and fast food outlets. This area is relatively flat, allowing for these large floor plate land uses. The industrial/ commercial/retail areas are set back from Mona Vale Road with some landscaping but are accessed from local side roads. Parking is typically located on on-site parking areas.

Construction of the proposed work is expected to take about two (TBC) years to complete and includes the following key features:

- + Widening Mona Vale Road between Manor Road and Foley Street from two lanes to four lanes (two-lanes in each direction)
- + Provision of a central concrete safety barrier along the length of Mona Vale Road from east of Manor Road to east of Daydream Street
- + Provision of three metre wide shoulders along the length of Mona Vale Road between Manor Road and Foley Street to allow for vehicle breakdowns and on-road cyclists
- + Provision of fauna connectivity measures at the end of Lane Cove Road (near Narrabeen Creek) by duplicating an existing culvert
- + Provision of a truck arrestor bed in a widened shoulder of the eastbound lane of Mona Vale Road as it approaches Walana Crescent
- + Relocation of the eastbound bus stop near the Ponderosa Parade and Samuel Street intersection on Mona Vale Road about 250 metres further east
- + Replacing the existing roundabout at the intersection of Ponderosa Parade and Samuel Street with traffic control signals and signalised pedestrian crossings. Approaches to the new signalised intersection will include:
 - Provision of two through lanes (eastbound) and two through lanes (westbound)
 - Provision of bus priority lanes on Mona Vale Road on the approaches to and departures from the intersection of Ponderosa Parade and Samuel Street
 - Provision of dedicated turning lanes from Mona Vale Road (eastbound) to Samuel Street (dedicated left turn lane), and to Ponderosa Parade (dedicated right turn lane)
 - Provision of dedicated turning lanes from Mona Vale Road (westbound) to Samuel Street (dedicated right turn lane), and to Ponderosa Parade (dedicated left turn lane).
- + Reconfiguration of the intersection with Emma Street to left turn in, and left turn out only
- + Upgrading the existing signalised T-intersection at Foley Street and Mona Vale Road to provide a westbound left turn lane into Foley Street and a westbound left turn lane out of Foley Street
- + Providing a 3.5 metre wide shared path (for pedestrians and cyclists) on the southern side of Mona Vale Road between Ponderosa Parade and Foley Street
- + Providing additional pedestrian connectivity in the form of a minimum 1.5 metre wide concrete path along Lane Cove Road linked to Mona Vale Road near Walana Crescent. Pedestrian connectivity for the proposal would be provided away from the Mona Vale Road corridor due to the steep descent from the Warriewood escarpment
- + Undertaking utilities relocation where required including the provision of a utility corridor along Lane Cove Road, away from the Mona Vale Road corridor
- + Posted speed limit of 80 kilometres per hour when both the Mona Vale Road East and West upgrades are complete
- + Posted speed limit of 60 kilometres per hour for truck and buses eastbound descending the escarpment
- + Provision of steep descent signage with flashing lights
- + Upgrade of the existing pavement and cross drainage systems including the construction, reconstruction and extension of pavement drainage lines
- + Construction of retaining walls, up to about six metres in height, at various locations within the proposal area*
- + The proposal would include about five main cuttings, up to 16 metres in height, at various locations within the proposal area
- + Installation of traffic monitoring cameras at all signalised intersections to assist with traffic management
- + Landscaping over the length of the proposal
- + Establishing temporary site compounds and stockpiles during construction.

**TBC following completion of the concept design to determine all retaining wall locations.*

The Proposal is illustrated in Figure 1.6.1 - The Proposal.



Figure 1.6.1 The Proposal

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+ 2.0 Contextual Analysis

2.1 Site Context

Mona Vale Road is a key east-west arterial road providing access to the Northern Beaches suburbs, residential, employment and industrial areas. The Mona Vale Road East Upgrade in particular provides access to Ingleside, Warriewood, Elanora Heights, Bay View, Church Point and forms a gateway to the regional centre at Mona Vale. The eastern end provides access to Pittwater Road and the western end ties into the existing dual carriageway at Manor Road / Lane Cove Road. (Refer to Figure 2.1.1 Site Context).

From west to east the proposal runs along the crest of a sandstone ridgeline before traversing down the steep Warriewood / Ingleside escarpment into the urban development of Mona Vale. It crosses the upper levels of the catchments of Narrabeen Creek and Mullet Creek and their tributaries which feed into Narrabeen Lakes to the south. The western end passes through significant areas of bushland while the eastern end passes through the urban areas on the outskirts of Mona Vale.

Study Area Summary Description

The study area can be divided into two corridor contexts (Refer to Figure 2.1.1 Site Context). These contexts are further subdivided into distinct landscape character zones in Section 3.0 Landscape Character Assessment.

Western Section

The western section between Manor Road / Lane Cove Road, Ingleside and the western edge of the urban areas of Mona Vale (about 200m west of Boundary Street) is primarily through bushland. Katandra Bushland Sanctuary on the northern side of the road and part of Ingleside Chase Reserve on the southern side are areas of high ecological value. A small number of residential properties occur adjacent to the road corridor but do not front onto Mona Vale Road. Only one of these properties has access from it.

Topographically, the highest points of the upgrade along the sandstone ridge are at about reduced level (RL160 – 165), with significant high points at Lix (RL179) and Foleys Hill to the north of the alignment. Following the ridgeline and descending down the escarpment the existing road offers a number of the views towards the Pacific Ocean and across Warriewood Valley and Mona Vale. Towards the eastern end the road traverses the escarpment, passes through a number of deep sandstone cuttings and is enclosed by tall treed edges. The signalised intersection between Mona Vale Road, Lane Cove Road and Manor Road forms the western end of this section. The upgrade connects with the existing upgrade at this point and has a more open character with a few adjoining properties overlooking the junction. Overhead power lines are visible on both sides of the existing road and add to the urbanised feel at this end of the section.

Existing key structures and landscape elements within the western section include:

- + The junction between Lane Cove Road and Manor Road with Mona Vale Road
- + High voltage overhead power lines
- + Rugged bushland setting with sandstone cuttings and trees and under storey vegetation immediately adjacent to the road
- + Views to the coastline and Pacific Ocean.

Eastern Section

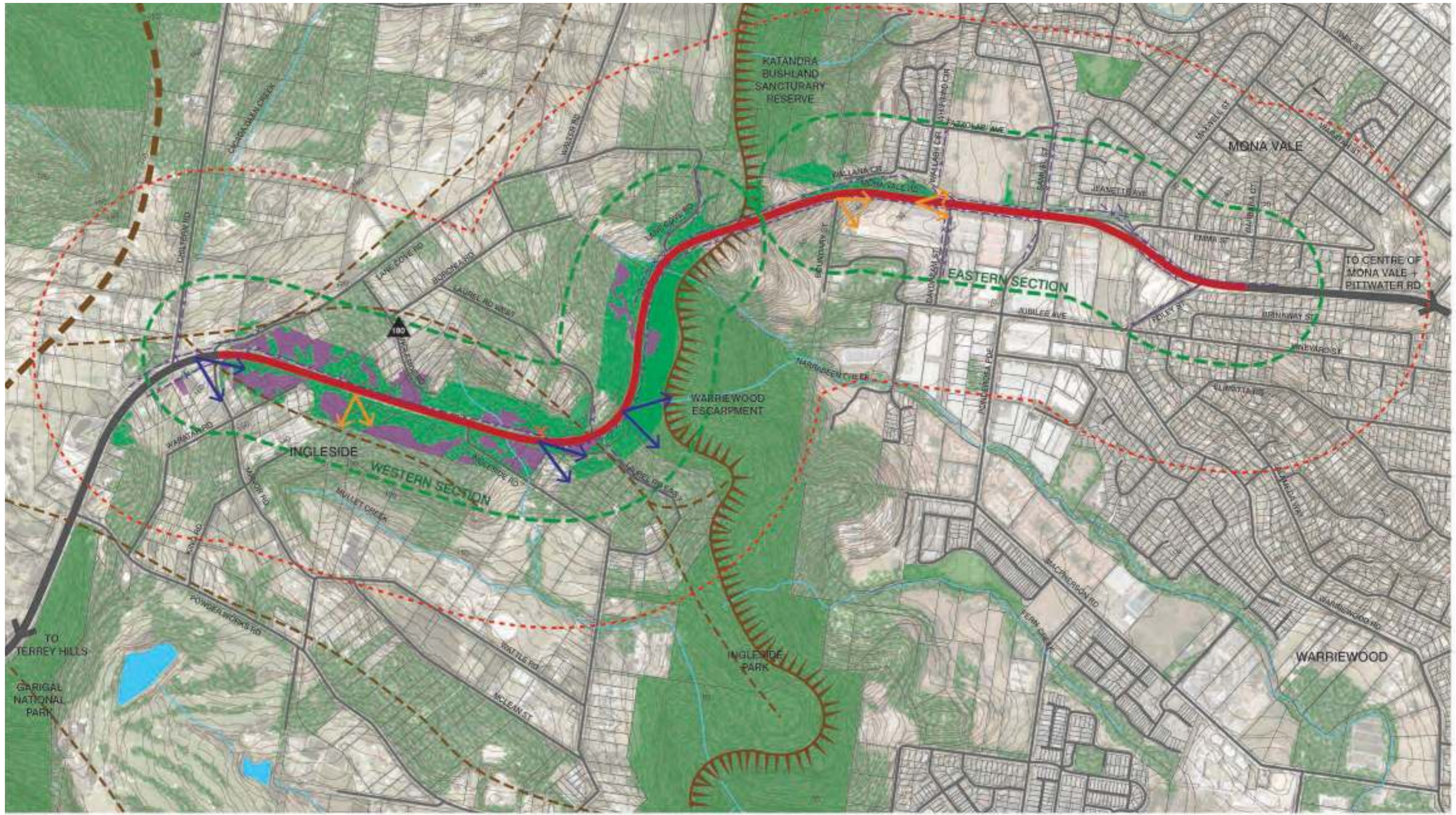
The eastern section from the junction with Foley Street to the western edge of the urban areas of Mona Vale (about 200m west of Boundary Street) contrasts strongly with the western section due to its predominantly urban character. The eastern section passes through the suburban residential and commercial outskirts of Mona Vale, that exist to the north and south of the alignment. Whilst having developed land uses on either side, the alignment does retain a “green” outlook particularly when travelling west towards the escarpment. The topography is also in contrast to the western section with a gently undulating landscape. The alignment rolls down westwards to a low point at the junction with Ponderosa Parade before beginning to climb up to the base of the Warriewood Escarpment. Views towards the escarpment are continuous from a high point at the intersection with Foley Street. Travelling from the west the views tend to be enclosed by the adjoining vegetation before providing more open urban views at the base of the escarpment east of Boundary Street.

The landscape buffer zones maintained as the western edge of Mona Vale are a mix of native and exotic species. Mature avenues of trees and some shrub understorey and grassed areas form the northern edge. Landscaped earth mounding and more formal plantings run along the southern boundary. Key land uses that adjoin Mona Vale Road include Mona Vale Cemetery and Pittwater RSL. Most residential properties have side or rear boundaries facing the road. However, between Emma Street and Foley Street they have street frontage and driveway access.

The commercial area comprises large offices, light industrial units, retail and fast food outlets. This area is relatively flat, allowing for these large floor plate land uses. The industrial/ commercial/retail areas are set back from Mona Vale Road with some amount of landscaping and accessed from local side roads. Parking is typically located in on-site parking areas such as around the fast food outlets.

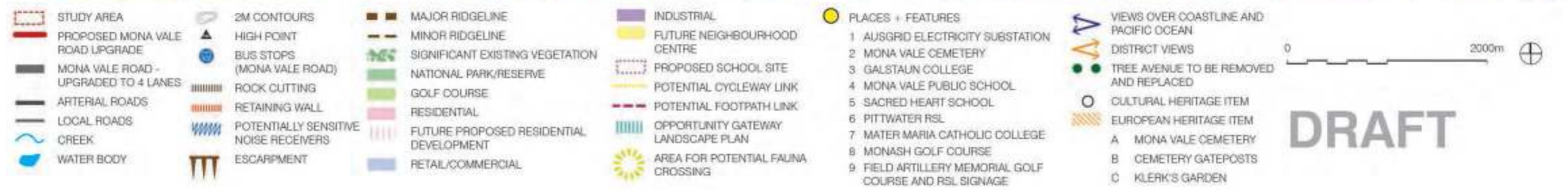
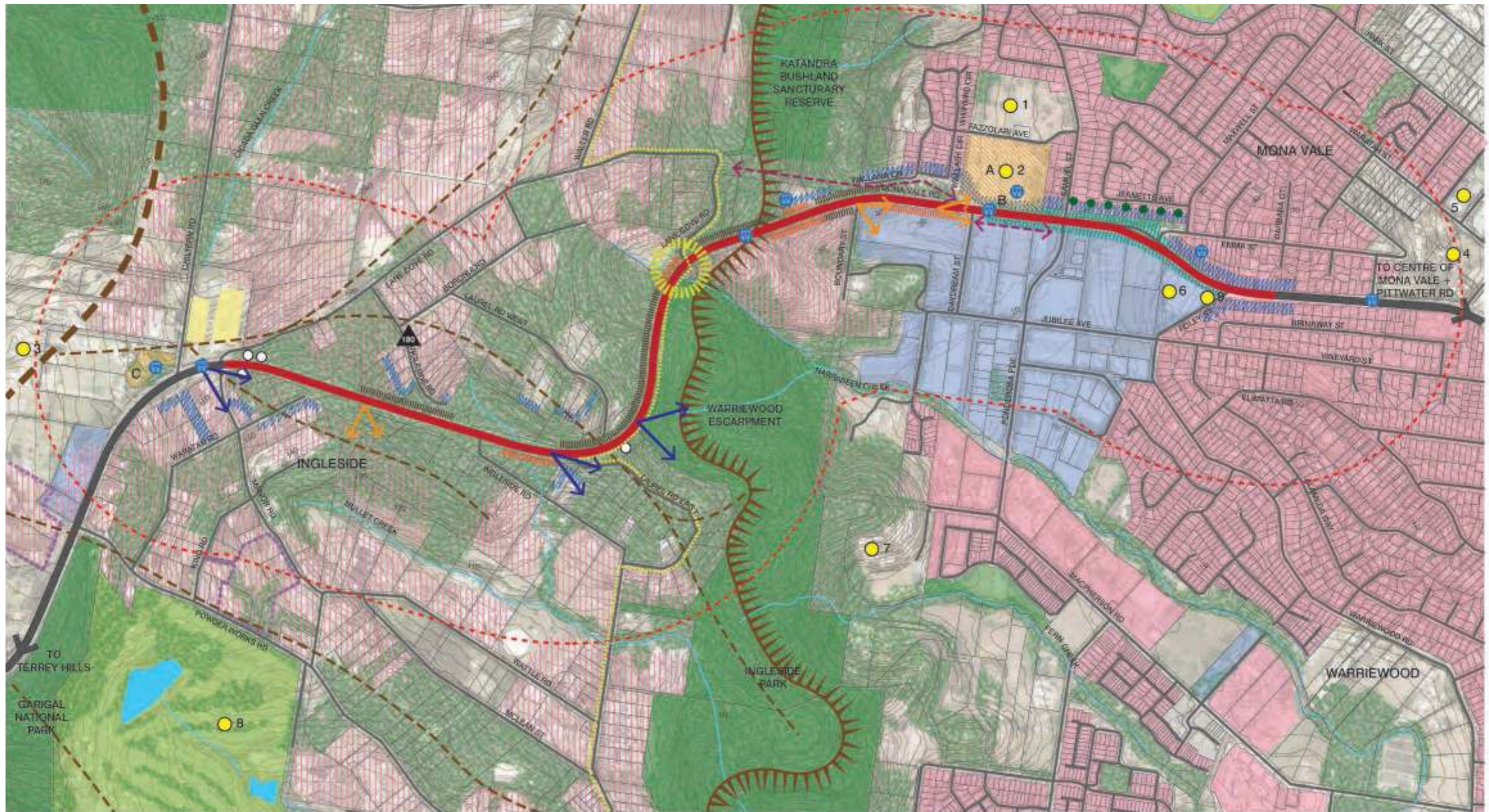
Existing key structures and landscape elements within the eastern section include:

- + The roundabout at Ponderosa Parade, Samuel Street and Mona Vale Road
- + Avenue of mature Camphor Laurels
- + The frontage to Mona Vale Cemetery
- + Intersections with Foley Street and Emma Street
- + Detention basin adjacent to the upgrade corridor
- + High Voltage Overhead wiring between timber poles
- + A concrete shared path connecting Emma Street to Samuel Street with an adjacent open drainage channel.



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Figure 2.1.1 Monna Vale Road East Upgrade - Site Context
 MONA VALE ROAD UPGRADE EAST: LANDSCAPE CHARACTER VISUAL IMPACT ASSESSMENT + URBAN DESIGN CONCEPT



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Figure 2.2.1 Mona Vale Road East Upgrade - Issues and Opportunities

2.2 Issues and Opportunities Summary

A range of urban design issues and opportunities have been identified during the site analysis process and are shown on Figure 2.2.1. Issues and Opportunities. Highlighting and discussing the issues on the site provides a baseline for proofing the design and ensures a more robust process when determining the fundamental implications of the proposed design for users, local residents and stakeholders.

Identifying potential opportunities allows the design process to prioritise certain elements or issues where appropriate and helps to ensure more efficient, sustainable and balanced design strategies and outcomes.

Issues include:

- + Significant vegetation of high ecological value
- + Steep topography
- + Cultural and European heritage items
- + Existing high voltage overhead power lines
- + Sensitive noise receivers particularly in the eastern end
- + Cyclists and pedestrian safety
- + Impacts on flora and fauna
- + Proximity of Mona Vale Cemetery
- + Impacts on Pittwater RSL and memorial artillery piece
- + Loss of existing mature trees that characterise the western edge of Mona Vale
- + Limited corridor width in the eastern end restricts tree planting opportunities.

Opportunities include:

- + The landscape design should emphasise the difference between the two broad corridor contexts. (Refer to Figure 2.1.1 Site Context)
- + Provide a suitable landscaped edge to Mona Vale Cemetery
- + Maintain the sandstone vegetation character
- + Reinstate suitable street tree planting to the western edge of Mona Vale
- + Maintain and enhance existing views and any new ocean views opened up as a result of the upgrade
- + Provide fauna connections where possible to reduce loss of fauna and increase connectivity
- + Explore opportunities for Avenue plantings along the eastern end of the upgrade
- + Improve pedestrian and cyclist safety and connectivity along and across the corridor. Improving amenity, sight lines and path connections for ease of movement
- + Maintain a landscape buffer between proposed residential areas and the upgrade
- + Maintain natural sandstone cuttings along the corridor
- + Provide a consistent landscaped edge to the commercial development between Foley Street and Boundary Street
- + The steep topography experienced when travelling across the escarpment adds to the travellers experience and should be maintained in the design of the upgrade, which should avoid the use of intrusive road furniture.

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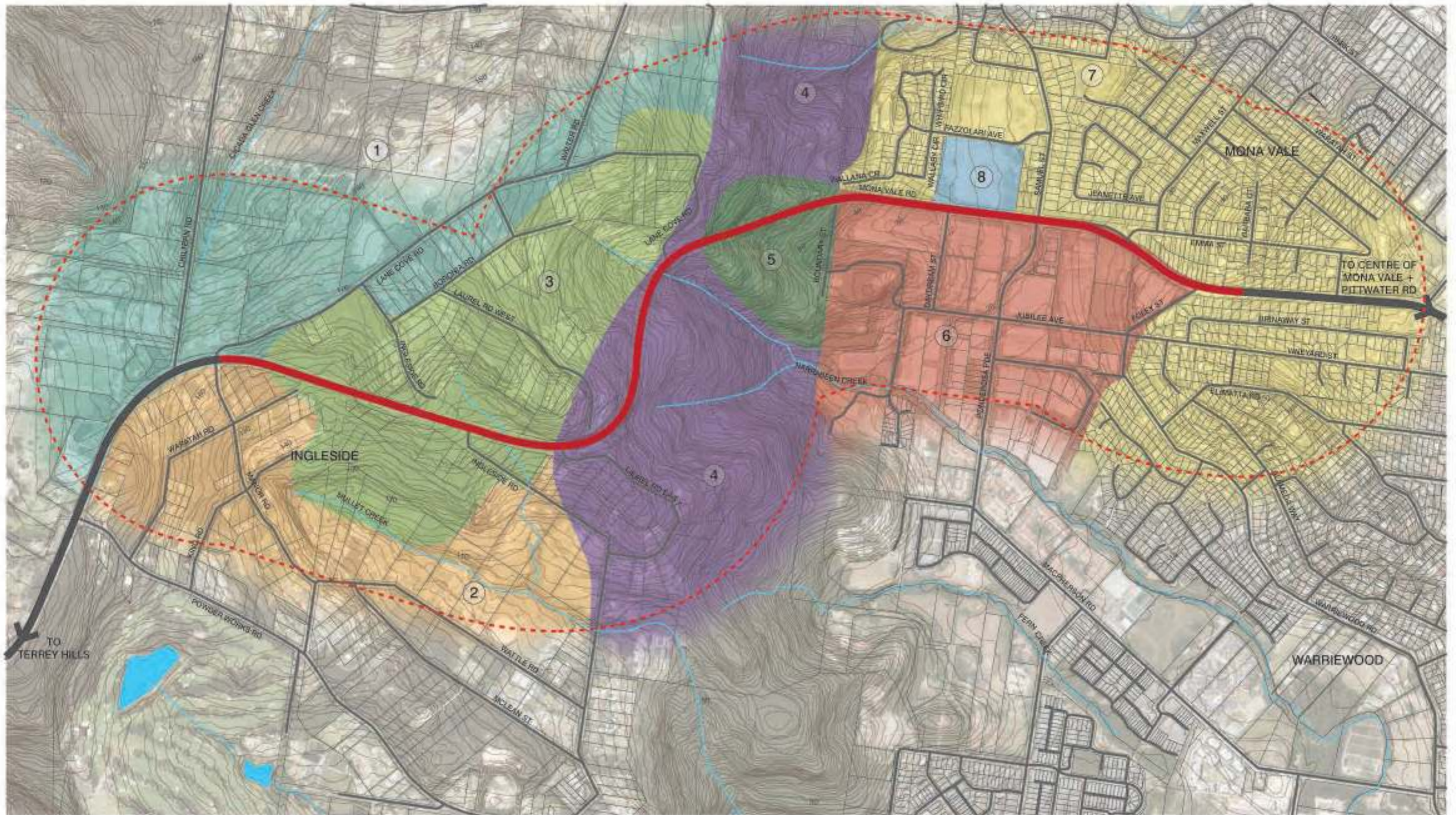


+ 3.0 Landscape Character Assessment

3.1 Landscape Character Zones

An analysis of the existing character of the Mona Vale Road East corridor was carried out to provide a baseline to assess the significance of likely changes resulting from the upgrade. The analysis involved identification of a number of landscape character zones (LCZ). These are mapped in Figure 3.1.1 Landscape Character Zones. The landscape character zones are areas that are relatively consistent in terms of their combination of landform, vegetation and land uses, while containing a degree of variation in visual landscape character. The following text, tables and photos describe each landscape character zone and its sensitivity to change.

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- STUDY AREA
- PROPOSED MONA VALE ROAD UPGRADE
- MONA VALE ROAD - UPGRADED TO 4 LANES
- ARTERIAL ROADS
- LOCAL ROAD
- ~ CREEK
- WATER BODY
- 2M CONTOURS

LANDSCAPE CHARACTER ZONES:

- | | |
|---|---|
| <ul style="list-style-type: none"> 1 INGLESIDE RESIDENTIAL 2 INGLESIDE VALLEY 3 INGLESIDE PLATEAU 4 WARRIEWOOD ESCARPMENT 5 LOWER ESCARPMENT AND FUTURE RESIDENTIAL DEVELOPMENT | <ul style="list-style-type: none"> 6 MONA VALE COMMERCIAL 7 MONA VALE RESIDENTIAL 8 MONA VALE CEMETERY |
|---|---|



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Figure 3.1.1 Monavale Road East - Character Zones

3.1.1 Landscape Character Zone 1 – Ingleside Residential

Description

This zone is characterised by an undulating ridge top landscape with heavily disturbed vegetation. Large houses setback from the roads on large lots are predominant with low height brick boundary walls and hedges behind wide grassed verges. Overhead power lines are common above the roadside verges. The area extends from the junctions of Chiltern Road and Lane Cove Road with Mona Vale Road, northwards along Lane Cove Road, Boronia Road and Walter Road. Locations along the eastern end of Lane Cove Road and Mona Vale Road at Chiltern Road have extensive long distant views of the Pacific Ocean and coastline to the south and east. A number of properties take advantage of these views particularly from the second storeys. Apart from the eastern end of this zone views of Mona Vale Road East are obscured by the topography and vegetation.



The extent of proposed works associated with the Mona Vale Road Upgrade affecting Zone 1 includes:

- + New concrete kerbing, concrete median with a twin steel rail modified “F” type barrier, widening to two lanes in each direction from the tie-in with the existing signalised junction at Lane Cove Road and the provision of shoulders two each carriageway.

Character Zone Description	
Landform	Undulating ridge top with slopes providing a northern aspect north of Lane Cove Road and southern aspect south of Lane Cove Road.
Vegetation	Heavily disturbed, with a mix of remnant and exotic species particularly within private gardens. Large areas of maintained grass.
Hydrology	Ridge top between the catchment of Cicada Glen Creek to the north west and Mullet Creek and Narrabeen Creek to the south and east.
Land Uses	Large lot residential, private gardens and local roads.
Built Form	Large residential properties, garages and ancillary buildings
Spatial	A natural ridge top landform with a mix of open garden frontages, large two storey houses setback from the roads and pasture with scattered trees, and enclosed areas of remnant and regrowth of tall shrubs and trees.

Sensitivity	LOW
--------------------	-----

- + Moderately modified existing road corridor within a semi rural neighbourhood ridge top setting
- + Low to moderate visual coherence, with a significant variability of built form and landscape.

Magnitude	LOW
------------------	-----

Addition of concrete kerbing, median and widening from Lane Cove Road westwards along Mona Vale Road.

Landscape Character Impact	LOW IMPACT
-----------------------------------	------------



01 View east along Lane Cove Road.



02 View north across Lane Cove Road from the junction with Mona Vale Road.



03 View west towards the signalised intersection between Lane Cove Road and Mona Vale Road from Lane Cove Road.



04 View west across the intersection between Mona Vale Road and Lane Cove Road.



05 View north east across Mona Vale Road.

3.1.2 Landscape Character Zone 2 – Ingleside Valley

Description

Zone 2 comprises the land sloping down from the ridgeline at Mona Vale Road to Mullet Creek. Extensively disturbed and varied, this marginal land contains large lots of pasture, commercial nurseries, hobby farms and large two storey houses and gardens. Road corridors and laneways are also varied with sections enclosed by scrubby remnant vegetation and open with wide grassed verges, various fence types and views to open paddocks. Power lines and other infrastructure are also present. Zone 2 extends to the south and east of Mona Vale Road from the junction with and along Manor Road including the areas adjacent to Waratah Road, King Road and Wattle Road. Locations along the upper valley near Mona Vale Road have extensive long distance views of the Pacific Ocean and coastline to the south and east. A number of properties take advantage of these views particularly from the second storeys. Views to the proposed Mona Vale Road upgrade are predominantly contained by existing vegetation and a minor ridge in the topography between Zone 2 and the upgrade on the northern side of the valley (within Zone 3).



The extent of proposed work affecting Zone 2 includes:

- + New concrete kerbing, concrete median with a twin steel rail modified “F” type barrier, widening to two lanes in each direction from the tie-in with the existing signalised junction at Lane Cove Road and the provision of shoulders to each carriageway. A retaining wall faces south towards the areas to the north of Ingleside Road.

Character Zone Description	
Landform	A varied moderately sloping valley landform with predominantly northern aspect. Sloping west to east from the ridgeline
Vegetation	Heavily disturbed, with a mix of remnant and exotic species particularly within the gardens. Large areas of maintained grass.
Hydrology	The southern face of the valley catchment to Mullet Creek.
Land Uses	Large lot residential, gardens, commercial nurseries, hobby farms and local roads and lanes.
Built Form	Large two storey residential properties, garages and ancillary buildings. Agricultural sheds, glass houses and a large water tank
Spatial	A natural valley landform with a mix of open garden frontages, large two storey houses setback from the roads, agricultural sheds and pasture with scattered trees, and enclosed areas of remnant and regrowth of tall shrubs and trees.

Sensitivity	LOW
--------------------	-----

- + Moderately modified existing road corridor within a semi rural neighbourhood valley side setting
- + Low to moderate visual coherence, with a significant variability of built form and landscape.

Magnitude	LOW
-----------	-----

- + Addition of concrete kerbing, median and widening from Lane Cove Road eastwards along Mona Vale Road
- + Addition of a retaining wall up to 4.5m high along the southern edge of the proposed upgrade.

Landscape Character Impact	LOW IMPACT
----------------------------	------------



01 View north across open pasture from Wattle Road towards the alignment of Mona Vale Road.



02 Open pasture, commercial properties and hobby farms are common.



03 View south down Manor Road from close to Mona Vale Road.



04 View south west along Waratah Road.

3.1.3 Landscape Character Zone 3 – Ingleside Plateau

Description

The topography along the plateau varies and includes the high point of the ridge line to the north of Mona Vale Road, the south facing slopes to Mullet Creek and the upper reaches of the catchment for Narrabeen Creek. Native vegetation covers most of the area interspersed with clearings in less steep areas for residential properties with large gardens. Laneways enclosed by tall trees and shrubs provide access to long driveways to these properties. Low voltage power lines follow these alignments. Locations along the ridges including Ingleside Road have extensive long distant views of the Pacific Ocean and coastline to the south and east. A number of the properties take advantage of these views particularly from the high ridgelines. Zone 3 extends from Mullet Creek northwards across Mona Vale Road to the eastern end of Lane Cove Road. Views are possible to Mona Vale Road, however the alignment is often below the line of sight due to topography and is generally contained by the tall and thick vegetation.



The extent of proposed work affecting Zone 3 includes:

- + New concrete kerbing, concrete median with a twin steel rail modified “F” type barrier, widening to two lanes in each direction, the provision of shoulders to each carriageway. A retaining wall facing south towards the areas to the north of Ingleside Road (south) and a significant cutting along the alignment to the south of Ingleside Road (north).

Character Zone Description	
Landform	Generally undulating with some steep slopes. The Study Area high point of 180m exists in this zone and the ridges and valleys generally face south and east.
Vegetation	Predominantly native open woodland and sandstone heath. Pockets of large gardens with some exotic species.
Hydrology	Mullet Creek and tributaries and the source of Narabeen Creek.
Land Uses	Native bushland with pockets of large residential properties.
Built Form	Large 1 – 2 storey houses.
Spatial	A natural landform of ridges and valleys. Enclosed lanes that open out at access points to the residential properties.

Sensitivity	MODERATE
--------------------	-----------------

- + The predominately native vegetation and natural topography give this zone a moderate sensitivity
- + Moderate to low level of coherence in the landscape although predominantly commercial/industrial built structures and semi-mature streetscape plantings.

Magnitude	MODERATE
------------------	-----------------

- + Widening of lanes and removal of vegetation
- + Provision of a large retaining wall up to 4.5m high.

Landscape Character Impact	MODERATE
-----------------------------------	-----------------



01 View north towards Mona Vale Road from Ingleside Road.



02 View east along Mona Vale Road.



03 View west along Lane Cove Road.



04 View west along Mona Vale Road.

3.1.4 Landscape Character Zone 4 – Warriewood Escarpment

Description

The Warriewood Escarpment runs north to south across the project area forming a significant geological feature in the Mona Vale area. The topography along the east facing escarpment varies from steep to very steep in places, with occasional areas flat enough to allow for residential development. The steep terrain has ensured most of the area has been retained as native bushland. Lanes enclosed by tall trees and shrubs provide access to long driveways to the residential properties. Low voltage power lines follow these alignments. Zone 4 extends for the length of the escarpment from Laurel Road East in the south, across Mona Vale Road to the north.

The extent of proposed work affecting Zone 4 includes:

- + New concrete kerbing, concrete median with a twin steel rail modified “F” type barrier, widening to two lanes in each direction, the provision of shoulders to each carriageway
- + A significant cutting along the alignment, north to south along the escarpment, a retaining wall and culvert facing west across Narrabeen Creek and widening of existing cuttings east of Lane Cove Road. A potential fauna crossing.



Character Zone Description	
Landform	Generally undulating steep escarpment running north to south.
Vegetation	Predominantly native open woodland and sandstone heath. Some pockets of private gardens with some exotic species
Hydrology	Narrabeen Creek and a tributary runs west to east down the escarpment within the project area.
Land Uses	Native bushland with small pockets of large-lot residential properties.
Built Form	Small number of 2 storey residential properties
Spatial	A natural landform of steep sloped escarpment. Enclosed lanes that open out at access points to the residential properties.

Sensitivity	HIGH
--------------------	-------------

- + The escarpment forms a geological feature to the west of Mona Vale
- + A high level of coherence in the landscape with significant undisturbed bushland areas.

Magnitude	MODERATE
------------------	-----------------

- + Road alignment widening throughout Zone 4 requiring significant cuttings
- + Clearing of vegetation required
- + Potential for a fauna overpass.

Landscape Character Impact	MODERATE - HIGH
-----------------------------------	------------------------



01 View north from Wallana Crescent into the Warriewood escarpment.



02 View south across zone from Mona Vale Road.



03 View south from Laurel Road west towards Mona Vale Road.



04 View north from Laurel Road West.



05 Typical view of Ingleside Chase Reserve.



06 View east from Lane Cove Road.

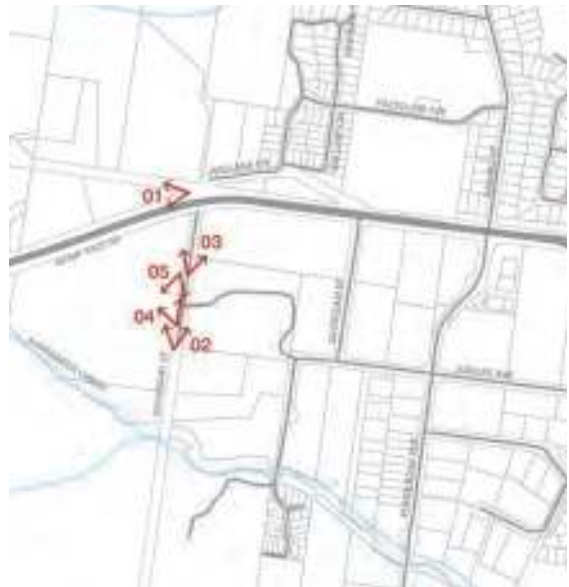


07 A typical view north east into the character zone from Lane Cove Road.

3.1.5 Landscape Character Zone 5 – Lower Escarpment and Future Residential Development

Description

Zone 5 is a transitional area at the base of the escarpment and adjacent to the commercial areas on the edge of Mona Vale to the east. Facing east the lower edge of the escarpment is varied and steep in places. The existing Mona Vale Road alignment passes through substantial sandstone cuttings through this area and is enclosed by remnant tall vegetation in places. Beyond the immediate road corridor the land has been cleared and is currently open pasture and “marginal” land. Glimpses of views are possible from the existing road corridor across this zone. Driveways provide access to individual residential properties setback from the road corridor. Most of the zone to the south of Mona Vale Road is proposed to be developed for a residential subdivision. Overhead power lines follow the Mona Vale Road alignment.



The extent of proposed work affecting Zone 5 includes:

- + New concrete kerbing, concrete median with a twin steel rail modified “F” type barrier, widening to two lanes in each direction, the provision of shoulders to each carriageway
- + Significant sandstone cuttings and retaining walls will be required on either side of the upgrade.

Character Zone Description	
Landform	Generally undulating steep escarpment running north to south.
Vegetation	Remnant native vegetation and open pasture. Some exotic species particularly associated with private gardens.
Hydrology	No creek or drainage lines in this zone. Surface runoff runs west to east down the escarpment.
Land Uses	Some residential properties, open pasture, agricultural uses and remnant vegetation. Future residential subdivision.
Built Form	Large-lot individual houses, agricultural buildings, sheds and garages.
Spatial	Open pasture on steep escarpment, enclosed character along the Mona Vale Road corridor.

Sensitivity	LOW
--------------------	------------

- + Modified existing road corridor adjacent to a semi rural valley setting
- + Low to moderate visual coherence, with a significant variability of built form and landscape.

Magnitude	MODERATE
------------------	-----------------

- + Road alignment widening throughout Zone 5 requires significantly wider cuttings and some retaining walls facing the zone
- + Clearing of vegetation required.

Landscape Character Impact	LOW - MODERATE
-----------------------------------	-----------------------



01 View west from Wallana Crescent into zone.



02 View north from Boundary Street.



03 View north from Boundary Street towards Mona Vale Road.



04 View west from Boundary Street across zone.



05 View west from Boundary Street.

3.1.6 Landscape Character Zone 6 – Mona Vale Commercial

Description

Zone 6 is gently undulating with some steeper areas to the western edge of the zone closer to the escarpment. Commercial development is situated throughout the Zone from Foley Street in the east to Boundary Street in the west. Mona Vale Road forms the northern boundary and Narrabeen Creek forms the boundary between the commercial and residential areas to the south. The commercial development includes offices, retail, fast food outlets, warehousing, small unit businesses and workshops and the large entertainment and sports complex of the Pittwater RSL. Formal streets provide access to these large lots with on street and off street parking areas. Grassed verges, formed concrete footpaths and a mix of formal and informal street tree planting define the street character. Street lighting and overhead powers lines are also present. The roundabout at the junction between Mona Vale Road and Ponderosa Parade forms the main formal entrance to the commercial development. Formal landscapes often sit between the street edge and the modern office buildings. Some vacant lots exist and some areas of remnant native vegetation remain between Samuel Streetw buildings or on areas too steep for commercial development.

The Pittwater RSL defines the eastern edge with its flag pole, field artillery piece and signage dominating the view from Mona Vale Road when travelling west. A landscaped edge screens the building, tennis courts and bowling greens from most of Mona Vale Road. A large blockwork-lined detention basin located west of Daydream Street forms an edge to Mona Vale Road.

The extent of proposed works affecting Zone 6 includes:

- + New concrete kerbs, traffic islands and grass verges to Mona Vale Road with a new signalised intersection at Ponderosa Parade, and an intersection upgrade at Foley Street
- + Removal and replacement of vegetation along the edge of Mona Vale Road
- + New shared paths, footpaths, street lighting and signage.

Character Zone Description	
Landform	Gently undulating
Vegetation	A mix of formal and informal street trees of mostly native species. A mix of native and exotic formal and screening shrubs and grasses along building frontages and lot boundaries. Low screen/feature planting on earth mounding around the entrance to Ponderosa Parade and car parking to the fast food outlets. Some remnant native trees in pockets between development. Native tree and shrub planting in the linear park along Narrabeen Creek.
Hydrology	Narrabeen Creek forms the southern boundary to this zone, running west to east from the Warriewood Escarpment.
Land Uses	Commercial, retail, light-industrial and business park developments.
Built Form	Large footprint 2 - 4 storey commercial office buildings, warehousing, workshops. Single storey drive-through fast food outlets.
Spatial	Generally enclosed streetscape areas with a mix of informal and formally defined margins and views confined by buildings, street plantings and car parking.

Sensitivity **LOW**

- + Highly modified industrial/commercial setting
- + Variable quality of built form and landscape.

Magnitude **LOW**

- + Widening to the existing Mona Vale Road corridor
- + New signalised intersection and vegetation removal and replacement.

Landscape Character Impact **LOW**



01 View across Mona Vale Road towards the RSL signage at the junction with Foley Street.



02 View at the junction of Mona Vale Road and Ponderosa Parade.



03 View north along Daydream Street towards Mona Vale Road.



04 View west over the blockwork lined detention basin towards the escarpment.



05 View north towards Mona Vale Road across the roundabout on Ponderosa Parade.



06 Informal street tree planting along Daydream Street.



07 Typical office development with car parking and landscaped frontages to Mona Vale Road.

3.1.7 Landscape Character Zone 7 – Mona Vale Residential

Description

The topography this landscape character zone varies from gently undulating to steep terrain. The residential sub division and street pattern reflects the varied topography found in this zone. The zone covers the western edges of Mona Vale from north of Mona Vale Road from the recently developed Wallana, Wallaby and Whipbird Crescents eastwards around Mona Vale Cemetery towards Mona Vale. From south of Mona Vale Road the zone extends from Foley Street to the south and east.

Properties along the eastern section of Mona Vale Road face the road and have driveway access. Further west properties back onto the road with high back fences accessed from local roads and cul-de-sacs.

Most streets have concrete footpaths and grassed verges with street trees and overhead power lines. A tree lined edge exists along Mona Vale Road with over mature *Camphor laurel* trees that require replacement. Drainage swales form part of this edge.

The extent of proposed works affecting Zone 7 includes:

- + New concrete kerbs, traffic islands and grass verges to Mona Vale Road with a new signalised intersection at Ponderosa Parade, truck arrestor bed
- + Removal and replacement of vegetation along the edge of Mona Vale Road
- + New shared paths, footpaths, street lighting and signage.

Character Zone Description	
Landform	Highly modified residential landscape with gently undulating to steep hills.
Vegetation	There is some vegetation within the existing road corridor, comprising large over mature native trees. A mix of formal and informal street trees of mostly <i>Camphor laurel</i> species occur along the residential streets.
Hydrology	Highly modified throughout the residential area.
Land Uses	Residential, suburban streetscapes.
Built Form	Low density residential development of 1-2 storey detached dwellings with street-front and off-street car parking. Tall boundary fences enclose properties and screen activity from Mona Vale Road between Samuel Street and Emma Street.
Spatial	Generally enclosed suburban streetscape.

Sensitivity	MODERATE
--------------------	-----------------

- + Existing highly modified road corridor visually buffered in places from residential neighbourhood
- + Close proximity of private residential properties.

Magnitude	MODERATE
------------------	-----------------

- + Widening to the existing Mona Vale Road corridor
- + New signalised intersection and vegetation removal and replacement
- + Potential temporary loss of vegetation screening.

Landscape Character Impact	MODERATE
-----------------------------------	-----------------



01 View south along Samuel Street towards Mona Vale Road.



02 A view north along the recently developed Wallaby Circuit.



03 View west along Emma Street to Mona Vale Road.



04 Drainage swale and mature *Camphor laurel* trees between Samuel Street and Emma Street along Mona Vale Road.



05 View east along Wallana Crescent.

3.1.8 Landscape Character Zone 8 – Mona Vale Cemetery

Description

This is a special zone specifically defined for the Mona Vale Cemetery and its key frontage along Mona Vale Road. Located between Mona Vale Road and Fazzolari Avenue on a gently sloping parcel of land the cemetery is over 100 years old. Local heritage listed, the original layout, historical burial sites and sandstone gateposts are the most important heritage items within the cemetery. The heritage sandstone gateposts currently painted white mark the original entrance to the cemetery on the edge of Mona Vale Road. These gateposts were constructed in 1929 by local stonemason James Booth. The cemetery layout follows a grid with burial sites orientated east-west. Mature trees have progressively been removed to allow for more burial sites and the memorial gardens have been moved to the eastern boundary. Cypress pines planted in 1970 follow a former avenue and are being removed as they die off and the spaces created used for burial sites. A columbarium (niche wall) for the placement of cremated ash remains was started in 1974 and provides some visual separation to Mona Vale Road. A Plan of Management has been developed by Pittwater Council and was adopted in 2013.



The extent of proposed works affecting Zone 8 includes:

- + New concrete kerbs, traffic islands and grass verges to Mona Vale Road with a new signalised intersection at Ponderosa Parade
- + Removal and replacement of vegetation along the edge of Mona Vale Road
- + New shared paths, footpaths, street lighting and signage.

Character Zone Description	
Landform	Gently sloping west to east.
Vegetation	Maintained grass with a mix of formal and informal tree plantings mostly around the edges of the cemetery. Remnants of former avenue plantings. Garden areas contain a mix of species.
Hydrology	A detention basin exists in the south west corner of the zone.
Land Uses	Cemetery and associated facilities.
Built Form	Single storey office and maintenance buildings and columbariums (niche walls).
Spatial	Generally open area within the cemetery. Boundary walls, fencing and plantings provide visual edges to the zone.

Sensitivity	HIGH
--------------------	-------------

- + Local heritage listed cemetery with heritage items along Mona Vale Road
- + High visual coherence within the cemetery.

Magnitude	LOW
------------------	------------

- + Existing Mona Vale Road frontage
- + Installation of footpaths and new tree planting
- + Potential noise walls or additional niche walls.

Landscape Character Impact	MODERATE
-----------------------------------	-----------------



01 Mona Vale cemetery. Burial plots orientated in an east/west direction.



02 Heritage sandstone gate posts mark the original cemetery entrance from Mona Vale Road.



03 View east from Mona Vale Road along the frontage of the cemetery to Mona Vale Road.



04 Brick columbarium (wall niche) on southern boundary of cemetery.



05 A garden niche within the cemetery.

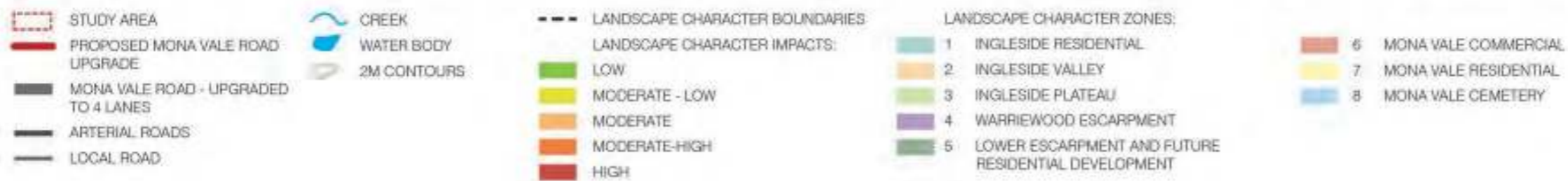
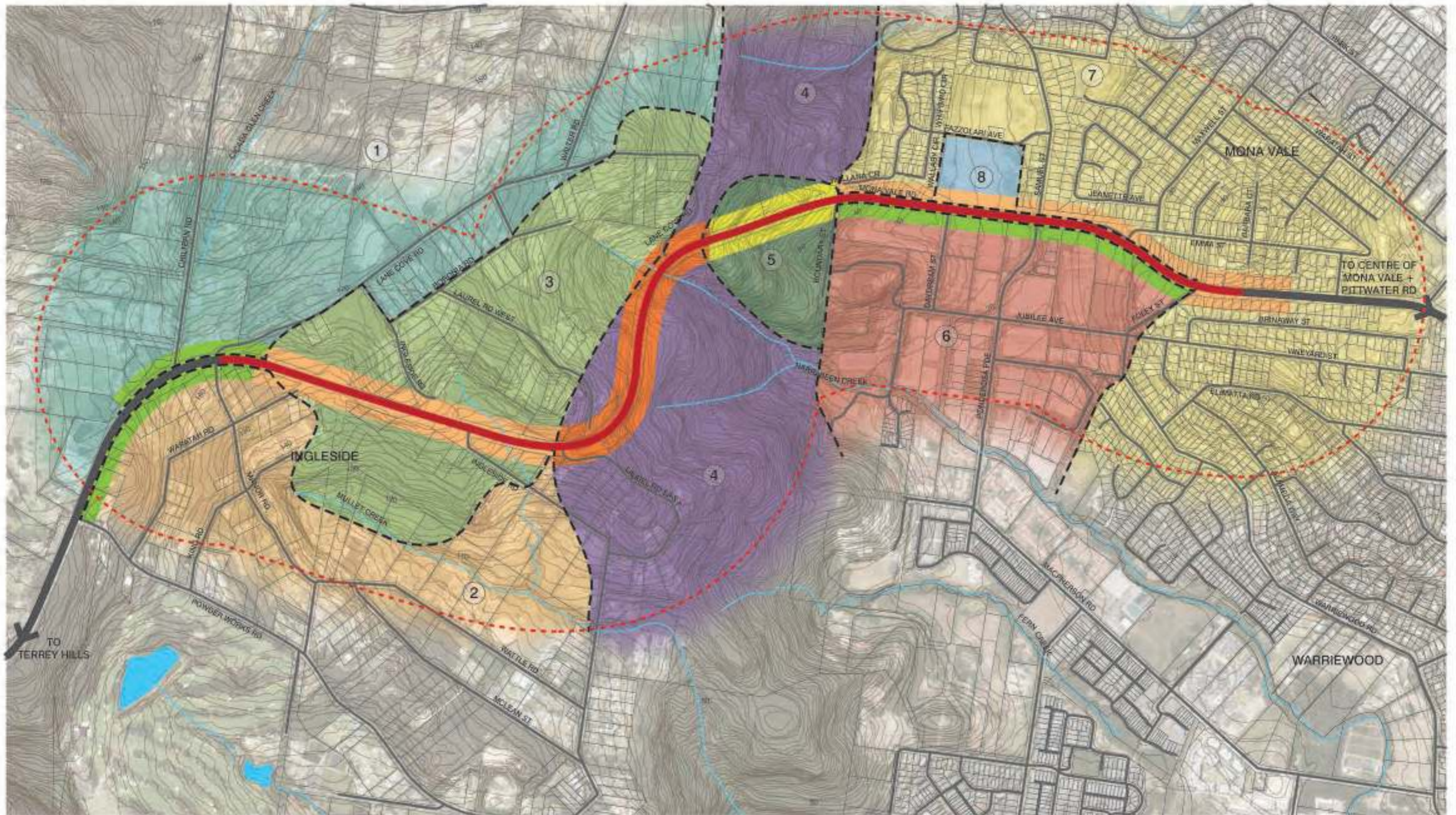


06 Main gate detail to Mona Vale Cemetery.

3.2 Summary of Landscape Character Zone Impacts

Figure 3.2.1 Landscape Character Zone Impacts Summary Diagram provides a visual summary of the zone-by-zone assessment in Section 3.1. This diagram allows the colour coded impacts within each landscape character zone to be directly and spatially compared.

Landscape Character Zone	Landscape Character Impact
1	LOW
2	LOW
3	MODERATE
4	MODERATE - HIGH
5	LOW - MODERATE
6	LOW
7	MODERATE
8	MODERATE



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Figure 3.1.2 Monna Vale Road East - Landscape Character Zone Impacts Summary Diagram
 MONA VALE ROAD UPGRADE EAST: LANDSCAPE CHARACTER VISUAL IMPACT ASSESSMENT + URBAN DESIGN CONCEPT

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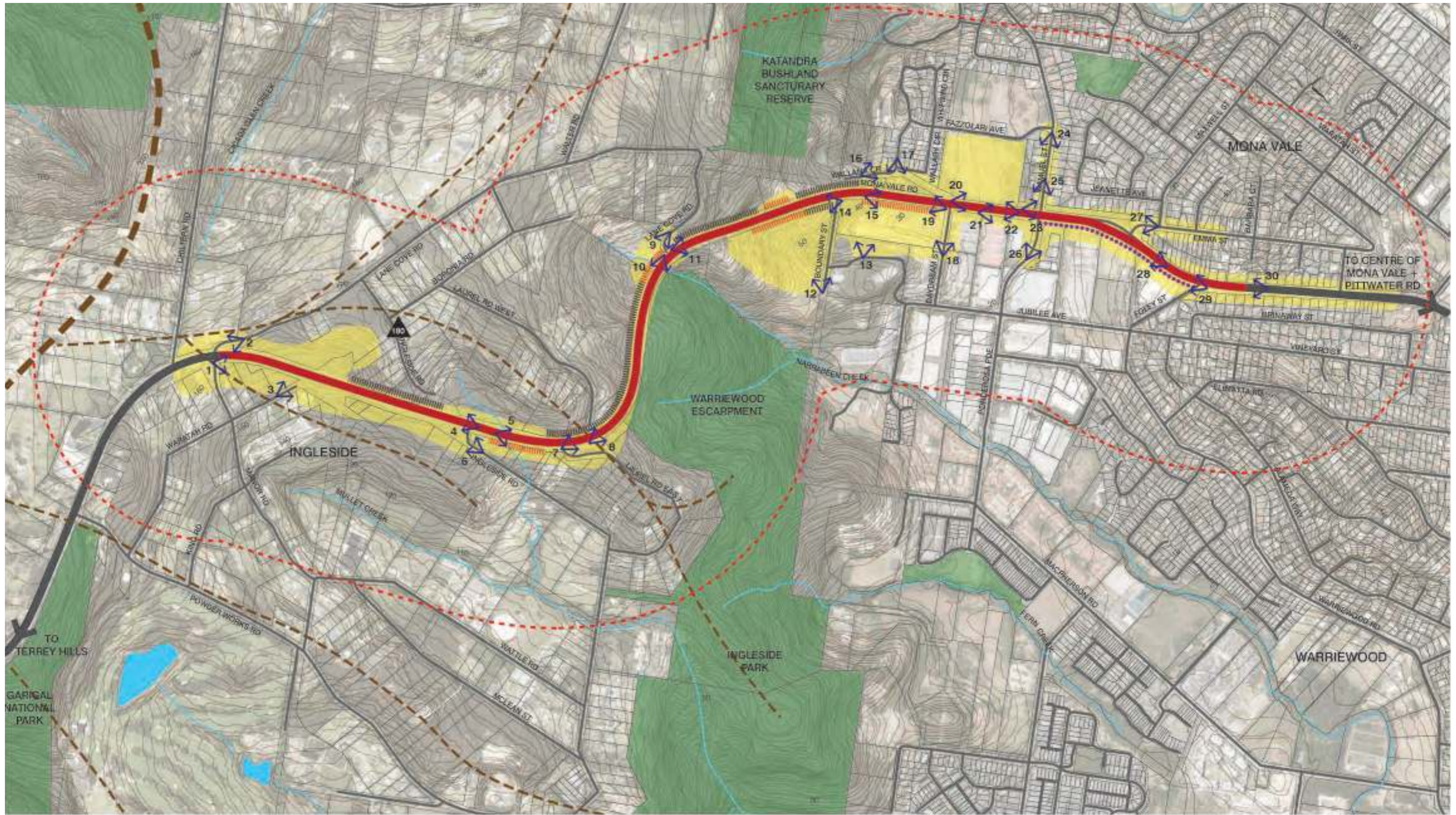
+ 4.0 Visual Impact Assessment

4.1 Visual Envelope

The Visual Envelope Map defines the visual catchment of the proposal. It generally describes the area surrounding the Proposal from which direct views to it are possible from any given location. Based on existing landforms, the visual catchment also takes into account vegetation, land uses and structures. Figure 4.1.1 Visual Envelope Map on the following page defines the visual catchment of the proposed highway upgrade works.

Site investigations were undertaken to review the visual catchment and take into consideration the screening effect of vegetation. Key viewpoints from which potential visual impacts are to be assessed are located on the Visual Envelope Map. These locations were determined on a site visit and from further desktop analysis.

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Figure 4.1.1 Visual Envelope Map and Viewpoint Location (East)
 MONA VALE ROAD UPGRADE EAST: LANDSCAPE CHARACTER VISUAL IMPACT ASSESSMENT + URBAN DESIGN CONCEPT

4.2 Visual Impact Assessment

The following table for each viewpoint documents the visual impact assessment from that viewpoint.

Table 4.2.1 Viewpoint 1 (Landscape Character Zone 2)

Visual Sensitivity	LOW
Magnitude of visual effect	LOW
Overall visual impact rating	LOW
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road alignment to provide two additional traffic lanes (two lanes in each direction) and 3m wide shoulders from the junction and to the east. New kerb drainage and a twin steel rail and concrete barrier within the median.	The visual impact is low. The sensitivity of Viewpoint 1 is low due to the existing junction and Mona Vale Road. However there would be some changes to the junction arrangement to allow for the shoulders required, resulting in a loss of some vegetation. This minor change to this viewpoint is small and maintains a low overall visual impact .
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.1: Existing view looking east towards the junction between Mona Vale Road, Lane Cove Road and Manor Road inbetween Landscape Character Zones 1 and 2.

Table 4.2.2 Viewpoint 2 (Landscape Character Zone 1)

Visual Sensitivity	LOW
Magnitude of visual effect	LOW
Overall visual impact rating	LOW
Elements of proposal visible	Comment
Potential loss of existing vegetation as a result of the widening may impact this viewpoint.	The visual impact is low: the sensitivity of Viewpoint 2 is low and the proposed widening of Mona Vale Road in this area would not remove a significant amount of existing vegetation. With the Mona Vale Road alignment being below Lane Cove Road the upgrade is hidden from view behind the existing vegetation. Existing street lighting, overhead power lines and traffic signals will not change significantly
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.2: Existing view looking west along Lane Cove Road towards the junction with Mona Vale Road from within Landscape Character Zone 1.

Table 4.2.3 Viewpoint 3 (Landscape Character Zone 2)

Visual Sensitivity	MODERATE
Magnitude of visual effect	LOW
Overall visual impact rating	LOW - MODERATE
Elements of proposal visible	Comment
The widening of Mona Vale Road on the southern edge by approximately 4-5m from the existing road edge will result in loss of vegetation that may result in the proposal becoming more visible.	The visual impact is low to moderate: while the sensitivity of the residential properties at this location is moderate, the existing native trees and shrubs currently screening the road to the properties will remain. The widening will result in the loss of vegetation particularly during construction. This will be mitigated by new planting post construction.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.3: Existing view looking north east along Waratah Road towards Mona Vale Road from within Landscape Character Zone 2.

Table 4.2.4 Viewpoint 4 (Landscape Character Zone 3)

Visual Sensitivity	MODERATE
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. The widening requires the clearing of existing vegetation.	The visual impact is moderate: the sensitivity of Viewpoint 4 is moderate due to its natural bushland setting. Retained trees beyond the zone of construction and the replanting of disturbed areas should maintain a similar character in the future reducing the visual impact.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.4: Existing view looking west along Mona Vale Road within Landscape Character Zone 3.

Table 4.2.5 Viewpoint 5 (Landscape Character Zone 3)

Visual Sensitivity	MODERATE
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. A retaining wall is required along and below the westbound carriageway facing the bushland. The wall will not be visible from this view point. The widening requires the clearing of existing vegetation.	The visual impact is moderate: the sensitivity of Viewpoint 4 is moderate due to its natural bushland setting. Retained trees beyond the zone of construction and the replanting of disturbed areas should maintain a similar character in the future, reducing the visual impact.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.5: Existing view looking east along Mona Vale Road from within Landscape Character Zone 3.

Table 4.2.6 Viewpoint 6 (Landscape Character Zone 3)

Visual Sensitivity	MODERATE
Magnitude of visual effect	LOW
Overall visual impact rating	LOW - MODERATE
Elements of proposal visible	Comment
The widening of Mona Vale Road on the southern edge by approximately 4m from the existing road edge will result in the loss of vegetation that may result in the proposal becoming more visible. The significant existing vegetation and proposed replanting along the road edge will mitigate any impacts.	The visual impact is moderate to low: the sensitivity of Viewpoint 6 is moderate due to its location within a natural bushland setting. The amount of visual change would be low due to the limited impact or loss of vegetation required on the southern side of the alignment.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.6: Existing view looking northwest towards Mona Vale Road from Ingleside Road.

Table 4.2.7 Viewpoint 7 (Landscape Character Zone 4)

Visual Sensitivity	HIGH
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE - HIGH
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. The existing cutting will be widened to the north and will reach a significant height with a bench required.	<p>The visual impact is moderate to high: the sensitivity of Viewpoint 7 is high due to its location within a natural bushland setting and at the edge of an escarpment.</p> <p>The amount of visual change would be moderate, due to the ultimate proposal being a wider version of the current situation with the existing cutting to the south being retained and the widening occurring along the inside of the curve away from the escarpment edge.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.7: Existing view looking east along Mona Vale Road from within Landscape Character Zone 4.

Table 4.2.8 Viewpoint 8 (Landscape Character Zone 4)

Visual Sensitivity	HIGH
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE-HIGH
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. The existing cutting will be widened to the north and will reach a significant height with a bench required.	The visual impact is moderate to high: the sensitivity of Viewpoint 7 is high due to its location within a natural bushland setting and edge of an escarpment. The amount of visual change would be moderate, due to the ultimate proposal being a wider version of the current situation and the widening occurring along the inside of the curve away from the escarpment edge.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.8: Existing view looking east along Mona Vale Road from within Landscape Character Zone 4.

Table 4.2.9 Viewpoint 9 (Landscape Character Zone 4)

Visual Sensitivity	HIGH
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE - HIGH
Elements of proposal visible	Comment
<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier.</p> <p>A retaining wall and new culvert will be required and widening of the existing cutting to the left of the picture.</p> <p>Potential fauna fencing.</p>	<p>The visual impact is moderate to high: the sensitivity of Viewpoint 9 is high due to the natural setting and close proximity to existing property.</p> <p>The amount of visual change would be moderate due to the current alignment. This alignment can be further mitigated by native tree and shrub planting.</p> <p>Visual impact can be further reduced by providing appropriate detailing to the retaining wall structure and planting along the frontage of the wall and culvert area.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.9: Existing view looking southwest towards Mona Vale Road from Lane Cove Road from the boundary between Zones 3 and 4.

Table 4.2.10 Viewpoint 10 (Landscape Character Zone 4)

Visual Sensitivity	HIGH
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE - HIGH
Elements of proposal visible	Comment
<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier.</p> <p>A retaining wall and new culvert will be required but these will not be visible from the road. Significant clearing will be required during construction of the road.</p> <p>Potential fauna fencing.</p>	<p>The visual impact is moderate to high: the sensitivity of Viewpoint 10 is high due to the natural setting and close proximity to existing property.</p> <p>The amount of visual change would be moderate due to the current alignment. The widening also occurs to the north of the alignment away from the edge of the escarpment, limiting the impact beyond the road corridor to the east. This alignment can be further mitigated by native tree and shrub planting.</p> <p>Visual impact can be further reduced by providing appropriate detailing to the retaining wall structure and planting along the frontage of the wall and culvert area.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.10: Existing view looking west along Mona Vale Road from the junction with Lane Cove Road, within Landscape Character Zone 4.

Table 4.2.11 Viewpoint 11 (Landscape Character Zone 4)

Visual Sensitivity	HIGH
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE - HIGH
Elements of proposal visible	Comment
<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier.</p> <p>The widening will require a substantial cutting to the north of the current alignment.</p>	<p>The visual impact is moderate to high: the sensitivity of Viewpoint 10 is high due to the natural setting and close proximity to existing property.</p> <p>The amount of visual change would be moderate due to the current alignment. The widening also occurs on the northern side of the alignment into the escarpment, limiting the impact beyond the road corridor to the south. The cutting is likely to be sandstone so should blend in with the current landscape character. This alignment can be further mitigated by native tree and shrub planting.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.11: Existing view looking east along Mona Vale Road from the junction with Lane Cove Road, within Landscape Character Zone 4.

Table 4.2.12 Viewpoint 12 (Landscape Character Zone 5)

Visual Sensitivity	LOW
Magnitude of visual effect	MODERATE
Overall visual impact rating	LOW - MODERATE
Elements of proposal visible	Comment
<p>It is possible that the widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders may be visible during construction.</p> <p>The widening will require a retaining wall to the south of the current alignment facing the view point.</p>	<p>The visual impact is low to moderate: the sensitivity of the adjoining land is low due to the existing alignment being screened by planting and the low visual coherence of the land. Most of the proposed widening occurs to the north of the alignment away from this view point.</p> <p>The amount of visual change would be moderate once replacement buffer planting establishes and limits views of the proposed retaining wall and embankment. It is preferable to retain existing screening trees within the corridor where possible to provide more immediate and effective screening of the proposed works from the land and future residential properties.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.12: Existing view looking north along Boundary Street towards the Mona Vale Road alignment, within Landscape Character Zone 5.

Table 4.2.13 Viewpoint 13 (Landscape Character Zone 6)

Visual Sensitivity	LOW
Magnitude of visual effect	MODERATE
Overall visual impact rating	LOW - MODERATE
Elements of proposal visible	Comment
<p>The widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders occurs to the south of the current alignment.</p> <p>The widening will require a substantial retaining wall to the south of the current alignment facing the view point. A substantial amount of clearing of existing vegetation will also be required.</p>	<p>The visual impact is low to moderate: the sensitivity of Viewpoint 13 is low due to the commercial development currently under construction and developed nature of the surrounding land. The magnitude is moderate due to the significant change required along the southern edge of the existing alignment to facilitate this widening, requiring the removal of existing trees and shrubs currently screening the alignment.</p> <p>The retaining wall required will sit behind the existing retaining wall facing the commercial development and will be for the most part hidden from this view point. The wall will be designed to be in keeping with the context and mitigated with planting in front of the wall.</p> <p>The highly modified and changing commercial setting results in a low to moderate visual impact. Proposed planting and appropriate designs for the retaining wall will mitigate the visual impact.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.13: Existing view looking north towards Mona Vale Road from the Uniting Church car park within Landscape Character Zone 6.

Table 4.2.14 Viewpoint 14 (Landscape Character Zone 5)

Visual Sensitivity	MODERATE
Magnitude of visual effect	HIGH
Overall visual impact rating	MODERATE TO HIGH
Elements of proposal visible	Comment
<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier.</p> <p>The widening will require a substantial cutting to the north of the current alignment.</p>	<p>The visual impact is moderate to high: the sensitivity of the viewpoint is moderate even though the wider landscape of Zone 5 is low and the magnitude of change as seen from this view point is significant. However, given the receptors at Viewpoint 14 are generally limited to vehicles travelling along Mona Vale Road, the sensitivity of this view remains moderate. The amount of visual change would be high due to the significant widening of the alignment to accommodate the additional lanes and the cutting required. A significant amount of vegetation clearing is required. This will be mitigated in the future by new screening trees and plantings along the southern edge of the alignment.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.14: Existing view looking west along Mona Vale Road from the junction with Boundary Street along the border between Landscape Character Zones 5 and 6.

Table 4.2.15 Viewpoint 15 (Landscape Character Zone 6)

Visual Sensitivity	MODERATE
Magnitude of visual effect	HIGH
Overall visual impact rating	MODERATE TO HIGH
Elements of proposal visible	Comment
<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier.</p> <p>The proposed provision of an arrestor bed to the north of the current alignment.</p>	<p>The visual impact is moderate to high: the sensitivity of the wider landscape of Zone 6 is low and Zone 7 is moderate, however magnitude of change to this view point is significant. However given the receptors at Viewpoint 14, is generally limited to vehicles travelling along Mona Vale Road, and potentially visible to the adjoining residential area to the north. The overall visual impact rating is moderate to high.</p> <p>The amount of visual change would be high due to the significant widening of the alignment to accommodate the additional lanes and the proposed arrestor bed. A significant amount of vegetation clearing is required. This will be mitigated in the future by new screening trees and plantings along both edges of the alignment.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.15: Existing view looking east along Mona Vale Road from the junction with Boundary Street at the border between Landscape Character Zones 6 and 7.

Table 4.2.16 Viewpoint 16 (Landscape Character Zone 7)

Visual Sensitivity	MODERATE
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE
Elements of proposal visible	Comment
The widening of Mona Vale Road and the proposed provision of an arrestor bed.	The visual impact is moderate: the sensitivity of the receptors near Viewpoint 16 is moderate, however the removal of the existing trees and shrubs between Wallana Crescent and Mona Vale Road for the arrestor bed is significant and would potentially result in a significant visual change to views from adjacent properties to the north of Wallana Crescent to the left of Viewpoint 16. Replacement tree planting as part of a sensitive design for the arrestor bed with vegetated earth mounding would potentially reduce the visual impact further in the long term.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.16: Existing view looking east along Wallana Crescent in Landscape Character Zone 7.

Table 4.2.17 Viewpoint 17 (Landscape Character Zone 7)

Visual Sensitivity	MODERATE
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE
Elements of proposal visible	Comment
The widening of Mona Vale Road and the proposed provision of an arrestor bed.	<p>The visual impact is moderate: the sensitivity of the receptors near Viewpoint 17 is moderate, however the removal of the existing trees and shrubs between Wallana Crescent and Mona Vale Road for the arrestor bed is significant and would potentially result in a significant visual change to views from adjacent properties to either side of Viewpoint 17.</p> <p>Replacement tree planting as part of a sensitive design for the arrestor bed with vegetated earth mounding would reduce the visual impact further in the long term.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.17: Existing view looking south along Wallaby Circuit towards Mona Vale Road from within Landscape Character Zone 7.

Table 4.2.18 Viewpoint 18 (Landscape Character Zone 6)

Visual Sensitivity	LOW
Magnitude of visual effect	LOW
Overall visual impact rating	LOW
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. Most of the widening occurs on the southern side of the alignment towards the view point. A footpath connection is provided to Daydream Street.	The visual impact is low: the sensitivity of receptors along Daydream Street is low due to the highly modified commercial setting. From the view point the magnitude of the impact is also low. The impact would also be mitigated by street tree and ground cover planting along the alignment.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.18: Existing view looking north from Daydream Street towards Mona Vale Road from within Landscape Character Zone 6.

Table 4.2.19 Viewpoint 19 (Landscape Character Zone 6)

Visual Sensitivity	LOW
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE TO LOW
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a low concrete median barrier. A retaining wall may be visible between the alignment and the existing detention basin. The arrestor bed may also be visible across the street from this view point.	<p>The visual impact would be low to moderate: The view has a low sensitivity due to the existing Mona Vale Road and the adjacent receptors are existing and future commercial properties.</p> <p>The amount of visual change would be moderate, resulting from the removal of the existing grass verge and vegetation to provide the additional lanes and footpath.</p> <p>Planting will be provided along the verge to mitigate the view. Screen planting may also mitigate the view of the arrestor bed.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.19: Existing view looking west from the verge along the southern side of Mona Vale Road adjacent to Daydream Street in Landscape Character Zone 6.

Table 4.2.20 Viewpoint 20 (Landscape Character Zones 6 and 8)

Visual Sensitivity	MODERATE
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a low concrete median barrier.	<p>The visual impact is moderate: The view has a moderate sensitivity as while it is already a two lane highway with the commercial area to one side the heritage listed Cemetery is located opposite.</p> <p>The amount of visual change would be moderate, resulting from the removal of the existing grass verge and vegetation to provide the additional lanes and footpath. Impacts to the cemetery are kept to a minimum.</p> <p>Low groundcover and feature street tree planting in the verge where clear zone requirements permit would help to recreate the visual character currently lost.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.20: Existing view looking east, from the verge along the southern side of Mona Vale Road adjacent to Daydream Street in Landscape Character Zone 6.

Table 4.2.21 Viewpoint 21 (Landscape Character Zones 6 and 8)

Visual Sensitivity	MODERATE
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier.	<p>The visual impact is moderate: The view has a moderate sensitivity as, while it is already a two lane highway with the commercial area to one side, the heritage listed Cemetery is located opposite.</p> <p>The amount of visual change would be moderate, resulting from the removal of the existing grass verge and vegetation to provide the additional lanes and footpath. Some vegetation may be lost along the frontage to the Cemetery and this will be mitigated by additional tree and shrub planting where constraints allow. Impacts to the cemetery will be kept to a minimum.</p> <p>Low groundcover and feature street tree planting in the verge where clear zone requirements permit would help to maintain the existing vegetated corridor character.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



ADDITIONAL LANES | FOOTPATH

Figure 4.2.21: Existing view looking east, from the verge along the southern side of Mona Vale Road adjacent to the commercial area between Daydream Street and Ponderosa Parade within Landscape Character Zone 6.

Table 4.2.22 Viewpoint 22 (Landscape Character Zones 6 and 8)

Visual Sensitivity	MODERATE
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a concrete median. Footpaths and planting including Memorial plantings will also be visible.	<p>The visual impact is moderate: The view has a moderate sensitivity due to the fact that there is already a two lane highway with the commercial area to the left and the heritage listed Cemetery to the right of the image.</p> <p>The amount of visual change would be moderate, resulting from the removal of the existing grass verge and vegetation to provide the additional lanes and footpath. Some vegetation may be lost along the frontage to the Cemetery and this will be mitigated by additional tree and shrub planting where constraints allow. Impacts to the cemetery will be kept to a minimum.</p> <p>Low groundcover and feature street tree planting in the verge where clear zone requirements permit would help to maintain the existing vegetated corridor character.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.22: Existing view looking west along Mona Vale Road on the edge of Landscape Character Zone 8 and towards Landscape Character Zone 6.

Table 4.2.23 Viewpoint 23 (Landscape Character Zones 7 and 8)

Visual Sensitivity	MODERATE
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction divided by a concrete median with additional widening at the junction. The roundabout will be replaced with a signalised intersection. Footpaths and planting including Memorial plantings will also be visible.	<p>The visual impact is moderate: The view has a moderate sensitivity due to the fact that there is already a two lane highway with the commercial area to the right and the residential area to the left of the image.</p> <p>The amount of visual change would be moderate, resulting from the removal of the existing grass verge and vegetation to provide the additional lanes, shared path and footpath. Some vegetation will be lost along the frontage to the Residential and this will be mitigated by additional tree and shrub planting where constraints allow.</p> <p>The palm trees and planting within the roundabout will be lost but the palms will be relocated to a suitable location. Over mature trees east of Samuel Street will be removed and replaced with a suitable tree species. Memorial plantings are also proposed for the area.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.23: Existing view looking east along Mona Vale Road across the existing roundabout at the junction with Ponderosa Parade and Samuel Street. Mona Vale Road runs between Landscape Character Zones 6 and 7 from this view point.

Table 4.2.24 Viewpoint 24 (Landscape Character Zone 7)

Visual Sensitivity	MODERATE
Magnitude of visual effect	LOW
Overall visual impact rating	MODERATE - LOW
Elements of proposal visible	Comment
The signalised intersection with Mona Vale Road.	The visual impact is low to moderate: The view has a moderate sensitivity however the amount of visual change to the view is low. Traffic signals may be visible and the removal of the roundabout planting. However this will not significantly affect the view point
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.24: Existing view looking south along Samuel Street towards Mona Vale Road in Landscape Character Zone 7.

Table 4.2.25 Viewpoint 25 (Landscape Character Zone 7)

Visual Sensitivity	MODERATE
Magnitude of visual effect	LOW
Overall visual impact rating	MODERATE - LOW
Elements of proposal visible	Comment
The signalised intersection with Mona Vale Road. Localised widening to the end of Samuel Street.	The visual impact is low to moderate: The view has a moderate sensitivity however the amount of visual change to the view is low. Traffic signals will be visible due to the removal of the roundabout and planting. However this will not significantly affect the view point.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.25: Existing view looking south along Samuel Street towards Mona Vale Road in Landscape Character Zone 7.

Table 4.2.26 Viewpoint 26 (Landscape Character Zone 6)

Visual Sensitivity	LOW
Magnitude of visual effect	LOW
Overall visual impact rating	LOW
Elements of proposal visible	Comment
The signalised intersection with Mona Vale Road. Localised widening to the end of Ponderosa Street.	The visual impact is low: The view has a low sensitivity and the amount of visual change is low Traffic signals will be visible due to the removal of the roundabout and planting. However this will not significantly affect the view point.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.26: Existing view looking north along Ponderosa Parade towards Mona Vale Road from within Landscape Character Zone 6.

Table 4.2.27 Viewpoint 27 (Landscape Character Zone 7)

Visual Sensitivity	MODERATE
Magnitude of visual effect	LOW
Overall visual impact rating	MODERATE - LOW
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction divided by a concrete median with additional widening at the junction. The roundabout will be replaced with a signalised intersection. Footpaths and planting including Memorial plantings will also be visible.	<p>The visual impact is low to moderate: The view has a moderate sensitivity as receptors would predominantly be local residents.</p> <p>The amount of visual change would be low, as the widening would not significantly impact the view. Over mature trees east of Samuel Street will be removed and replaced with a suitable tree species. Memorial plantings are also proposed for the area.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.27: Existing view looking west along Emma Street towards Mona Vale Road from within Landscape Character Zone 7.

Table 4.2.28 Viewpoint 28 (Landscape Character Zones 6 and 7)

Visual Sensitivity	MODERATE
Magnitude of visual effect	LOW
Overall visual impact rating	MODERATE - LOW
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction divided by a concrete median. A shared path will be provided on the southern side of the alignment.	The visual impact is low to moderate: The view has a moderate sensitivity as receptors would predominantly be users of Mona Vale Road, and residents living on the northern side. However given the scale of the existing road and minor widening required for the shared path at this location the amount of visual change is low. The bus stop will be relocated and memorial plantings are proposed where space allows on the southern side.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.28: Existing view looking northwest along Mona Vale Road between Landscape Character Zones 6 and 7.

Table 4.2.29 Viewpoint 29 (Landscape Character Zone 6)

Visual Sensitivity	LOW
Magnitude of visual effect	MODERATE
Overall visual impact rating	MODERATE - LOW
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction divided by a concrete median. The provision of an additional westbound lane into Foley Street and westbound lane out of Foley Street. The Pittwater RSL signage and field artillery piece will be relocated. A shared path and planting including Memorial plantings will also be visible.	The visual impact is low to moderate: The view has a low sensitivity as receptors would predominantly be road users and some residents of Mona Vale Road. The amount of visual change would be generally low. However the widening at the junction with Foley Street and improvements to include a shared path along the southern edge of Mona Vale Road will have a moderate impact on the frontage to Pittwater RSL. The RSL signage and field artillery piece will be relocated and Memorial plantings are also proposed for both sides of Mona Vale Road to maintain and improve the existing vegetated character.
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.29: Existing view looking west along Mona Vale Road towards the junction with Foley Street and Landscape Character Zone 6.

Table 4.2.30 Viewpoint 30 (Landscape Character Zone 7)

Visual Sensitivity	MODERATE
Magnitude of visual effect	LOW
Overall visual impact rating	MODERATE - LOW
Elements of proposal visible	Comment
Widening of the existing Mona Vale Road to provide two lanes in each direction and tie in to the existing upgraded section of Mona Vale Road.	<p>The visual impact is low to moderate: The view has a moderate sensitivity as receptors would predominantly be residents on either side of the road.</p> <p>The amount of visual change would be low, as the widening would not significantly impact the view due to its tying into the existing widening and occurring within the existing pavement area.</p>
Overall visual impact rating determined by using grading matrix in Table 1.4.2.	



Figure 4.2.30: Existing view looking west along Mona Vale Road within Landscape Character Zone 7.

4.3 Summary of Visual Impact

The visual impacts are highest in the areas where there is less space available within the corridor for the upgrade work to be implemented, where the adjoining land use is more urban or has heritage significance or where structures such as retaining walls are required.

The table below summarises the preceding viewpoint analysis, indicating the overall visual impact without mitigation.

Table 4.3 Overall Visual Impact for Each Viewpoint

Viewpoint	Visual Impact	Viewpoint	Visual Impact
VP1	LOW	VP16	MODERATE
VP2	LOW	VP17	MODERATE
VP3	MODERATE - LOW	VP18	LOW
VP4	MODERATE	VP19	MODERATE - LOW
VP5	MODERATE	VP20	MODERATE
VP6	MODERATE	VP21	MODERATE
VP7	MODERATE - HIGH	VP22	MODERATE
VP8	MODERATE - HIGH	VP23	MODERATE
VP9	MODERATE - HIGH	VP24	MODERATE - LOW
VP10	MODERATE - HIGH	VP25	MODERATE - LOW
VP11	MODERATE - HIGH	VP26	LOW
VP12	MODERATE - LOW	VP27	MODERATE - LOW
VP13	MODERATE - LOW	VP28	MODERATE - LOW
VP14	MODERATE - HIGH	VP29	MODERATE - LOW
VP15	MODERATE - HIGH	VP30	MODERATE - LOW



+ 5.0 Proposed Urban Design Strategy

This chapter outlines the urban design vision for the corridor, a corridor strategy, and a set of urban design objectives and principles to guide design development of the project.

Mona Vale Road is a vital east-west arterial road in the Northern Beaches region of Sydney. It serves as a freight, light vehicle and cycling route and caters in places for localised pedestrian movements. The road links Pittwater Road at Mona Vale to the Pacific Highway at Pymble. The Mona Vale Road East and West upgrades are the remaining sections of the road yet to be duplicated to provide two traffic lanes in each direction. Given the close proximity of the two sections, and the similarities in physical context, the urban design vision articulated here applies to both east and west upgrade projects.

5.1 Urban Design Vision

The road journey offers a variety of experiences, designed in response to the adjacent built and landscape context. This responsiveness to context provides a degree of legibility along the road for local people as well as wider regional users. These landscape experiences include traversing the ridgeline between the Garigal and Ku-ring-gai Chase National Parks, distant views to the Pacific Ocean and Sydney's northern beaches, the immediacy of the bushland adjacent to the road, large outcrops of Hawkesbury sandstone, both shallow and deep sandstone cuttings and views of the escarpment to the west. Travelling east, as the road leaves the national parks, a prominent landmark, the Baha'i Temple, comes into view. The road corridor then opens up to reveal views of the residential areas of Ingleside, the Warriewood valley and Mona Vale itself, as well as the Mona Vale commercial precinct, cemetery and RSL. The road passes through this important cultural zone which forms a recognisable entry to the town centre of Mona Vale.

5.2 Urban Design Strategy

The urban design strategy for the road corridor recognises the existing landscape character and seeks to integrate the widened road sensitively into its particular landscape setting. The design aims to reinforce and reveal the attributes of the Hawkesbury sandstone landscape while introducing new structures and elements where needed. Broadly speaking, the urban design approach is to maintain a level of consistency with existing duplicated stretches of Mona Vale Road and in particular to adopt a common suite of landscape elements for both the Mona Vale Road East and West Upgrades. Key ocean and coastal views, as well as district views, will be maintained. Disturbance to the natural and built environment is planned to be minimised through careful consideration of the most appropriate alignment while the suite of proposed architectural elements will contribute to the route's distinctiveness and legibility. See Figure 5.2.1 Urban Design Strategy

5.2.1 Urban Design Objectives and Principles

+ **Objective 1: To fit sensitively with the landform and bushland setting that gives the corridor its identity.**

Ensure that the urban, landscape and engineering design are well integrated and that the road sits comfortably along the ridgeline landscape.

The principles to achieve this are:

- Respond to existing landform and rock outcrops in the horizontal and vertical alignment of the road and road related structures
- Minimise as far as possible the use of retaining walls
- Maintain a consistency with adjacent, already widened sections of Mona Vale Road
- Ensure a quality outcome in any cuttings where weak clay seams or rock floaters are encountered
- Avoid the use of shotcrete and consider the use of salvaged sandstone blocks in areas of weakness
- Carefully consider the design of termination of cuttings so that they appear as natural as possible (new and extended cuttings through areas of sandstone rock should be carried out using methods that guarantee successful salvage of sandstone block and facing material of suitable size, shape and good condition for use where required in cuttings and/or embankments)

+ **Objective 2: To protect and incorporate natural patterns and ecology into the design.**

The principles to achieve this are:

- Consider the road alignment and footprint so as to minimise damage to the natural ecology including endangered vegetation and fauna habitat along the route
- Explore the potential for safe fauna connectivity across the corridor by means of culverts and fauna over-bridges in appropriate locations; ensure that design of fauna crossings minimises their visibility at road level and that approaches facilitate use by the identified species
- Design should aim to create optimal conditions for revegetation in all disturbed areas; in such areas use plants of local provenance from the appropriate ecological vegetation classes
- Ensure that fauna fencing is set back from the road edge and that it does not unnecessarily intrude on views; carefully consider terminations of fauna fencing in the design
- Ensure protection of areas of endangered vegetation

+ **Objective 3: To incorporate the heritage and cultural attributes of the corridor.**

The principles to achieve this are:

- Consider potential avenue planting using an appropriate memorial signifier tree species along Mona Vale Road, between Foley Street and Mona Vale Road RSL, and west of Ponderosa Parade, to create both a remembrance and town entry avenue
- Develop an appropriate road and precinct design along the frontage to the Mona Vale Cemetery to build upon the character of this heritage setting
- To otherwise respond sensitively to the heritage, cultural and natural sites and elements that occur adjacent to the road corridor

+ Objective 4: To achieve improved accessibility and connectivity across and along the corridor

The principles to achieve this are:

- Design for convenient connections to and across the road alignment to adjacent streets and areas
- Consider walking, cycling and public transport modes as part of the project scope and design
- Ensure that bus stops are connected to the local path network, are conveniently located for users and allow for continuing traffic flow
- Maintain clear, safe vehicle crossings at residential driveways and local road connections
- Consider a sensitive and functional design response to property frontages and driveways along Mona Vale Road, east of Emma Street
- Optimise the multi-use path route to create a stimulating experience for users and design to minimise gradients and coordinate with local road connections; consider shade provision and visual interest as well as sight lines in planting design

+ Objective 5: To achieve a legible experience in movement

Ensure a stimulating travel experience that highlights the features of the existing landscape.

The principles to achieve this are:

- Maintain and enhance existing views to the Pacific Ocean and ensure new views are exploited to improve the road user experience
- Consider the distinctive precincts that make up the corridor in the design strategy, not least the National Parks on either side of the corridor
- Emphasise the strategic points along the route so as to heighten the travel experience

+ Objective 6: To design a simple, unified and maintainable suite of road and roadside elements

The principles to achieve this are:

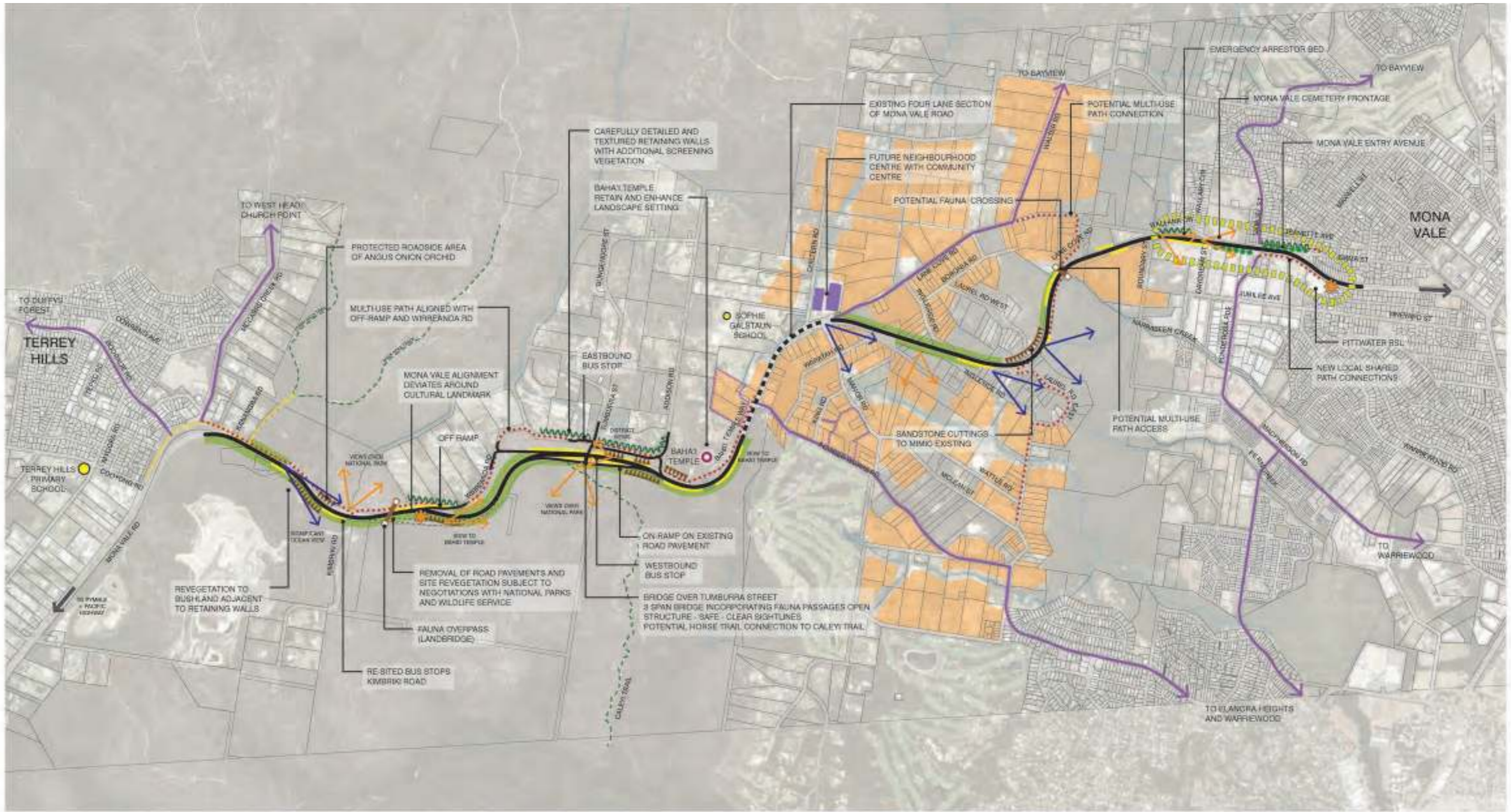
- Use standard road elements such as safety barriers, pedestrian fencing and signage in a neat, uncluttered and well articulated manner
- Ensure that road furniture does not detract from, or impede, existing or new views along the corridor
- Avoid noise walls as far as possible but where they are required fully integrate walls into the project design and the surrounding physical context

5.2.2 Surveillance and Safety

The design development phase of the project should consider Safety in Design and Crime Prevention Through Environmental Design (CPTED) in accordance with the guidelines as set out in the following document:

'Crime prevention and the assessment of development applications: Guidelines under section 79C of the Environmental Planning and Assessment Act (1979)', NSW Department of Urban Affairs and Planning (2001).

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- | | | | |
|--------------------------------|------------------------------|---|------------------------------------|
| SIGNIFICANT RETAINING WALLS | EXISTING SCHOOLS | OCEAN AND COASTAL VIEWS RETAINED AND ENHANCED | FAUNA OVERPASS |
| SIGNIFICANT SANDSTONE CUTTINGS | INGLESIDE DRAFT CONCEPT PLAN | DISTRICT VIEWS | MULTI-USE PATH ALIGNMENT |
| STREET TREE PLANTING | FUTURE RESIDENTIAL AREAS | CULTURAL LANDMARK | RECREATIONAL CYCLE ROUTE (ON-ROAD) |
| NATIVE BUSHLAND EDGE | FUTURE NEIGHBOURHOOD CENTRE | POTENTIAL MONA VALE ENTRY AVENUE PLANTING | TRAILS |
| SCREENING VEGETATION | | | POSSIBLE HORSE TRAIL |

Figure 5.2.1 Mona Vale Road Upgrade - Urban Design Strategy

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+ 6.0 Urban Concept Design

6.1 Concept Design Overview

The concept design applies the urban and landscape design principles and objectives articulated in *Section 5.0 Proposed Urban Design Strategy*. These principles and objectives will be considered through all phases of the proposal. They will inform all design decisions and be used in the evaluation of design proposals.

The Mona Vale Road East urban design concept is comprised of a series of plans that illustrate the entire corridor of the proposed upgrade and selected cross-sections at particular locations to demonstrate the application of these principles. The cross-sections across the alignment are generally shown in places where considerable change is likely or significant new elements will be added. Details of proposed finishes to retaining walls are included as is a perspective view of the proposed Mona Vale Entry Avenue Planting between Daydream Street and Ponderosa Parade in Mona Vale.

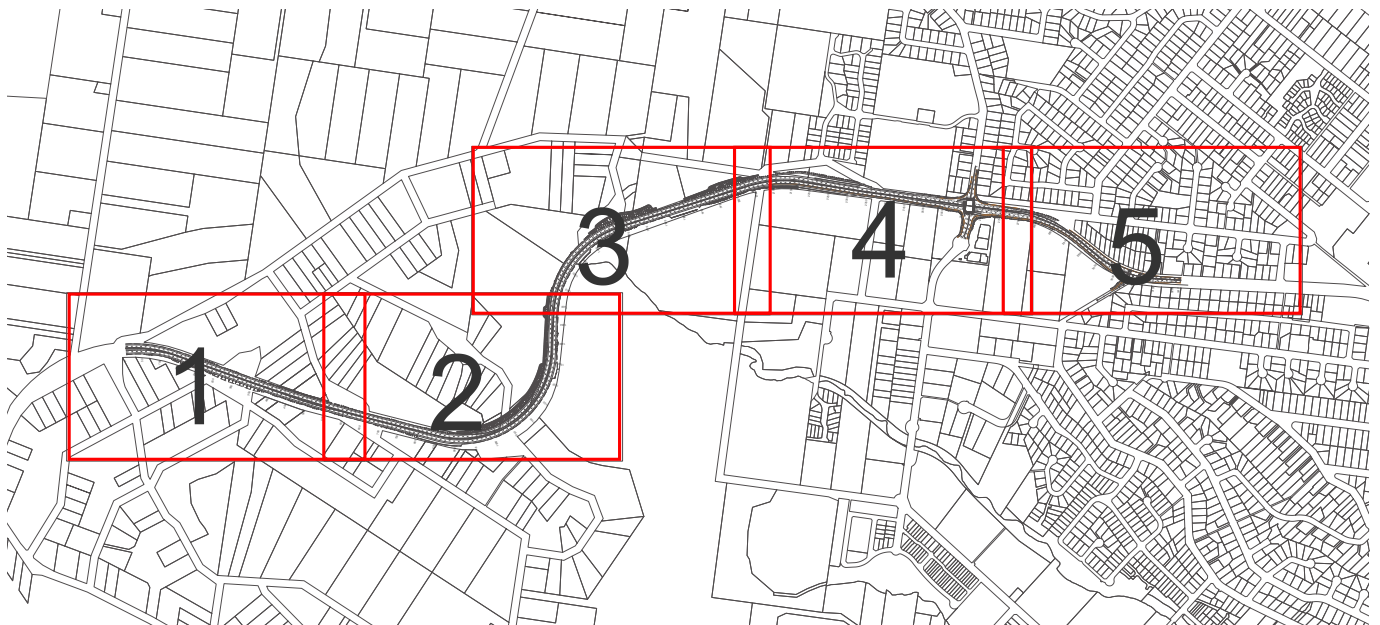


Figure 6.1.1 Concept Key Plan below shows the relative position of each concept plan in the wider context.

6.2 Concept Designs at Specific Locations

The following plans and sections illustrate the proposed urban and landscape concept design for the Mona Vale Road East upgrade.

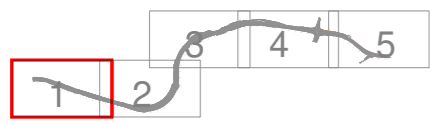
6.2.1 Concept Plan 1

Refer to Figures 6.2.1.1 to 6.2.1.2

Manor Road to Ingleside Road (Ch.0 – 600)

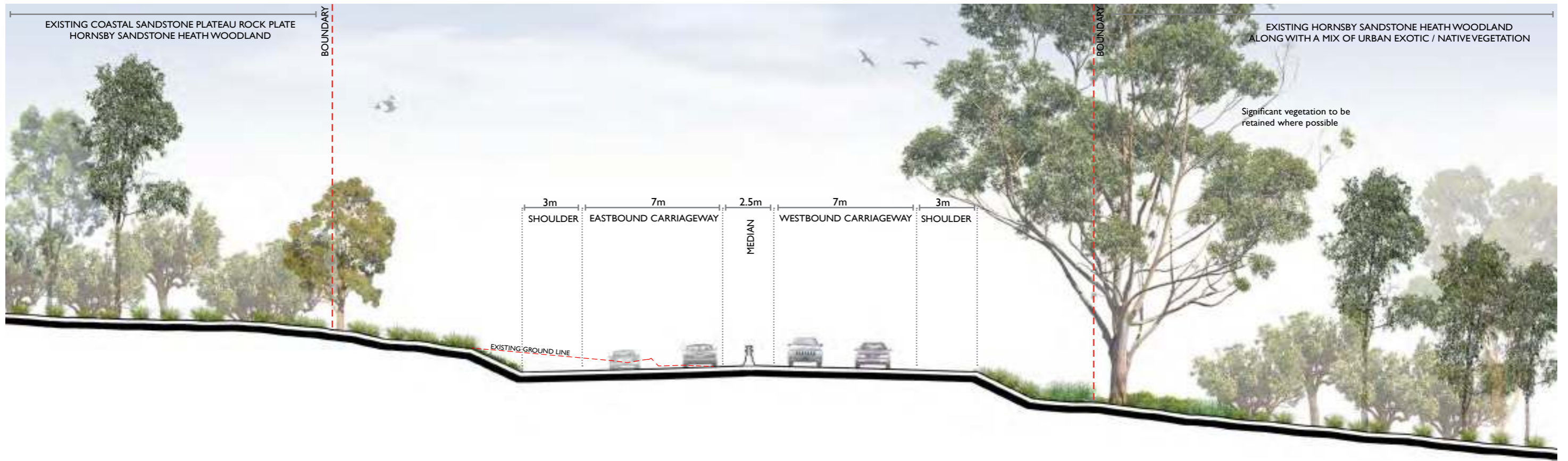
From the tie in at Manor and Lane Cove Roads, the upgrade occurs largely to the northern side but for the new west bound carriageway shoulder that occurs on the south. This necessitates some small battered earth embankments that will require revegetation to blend these disturbed areas back into the existing roadside landscape. The first sandstone cutting occurs on the northern edge at chainage 210 and a second more substantial one to about 7 metres high begins at chainage 350.

See over page for description of landscape proposal.

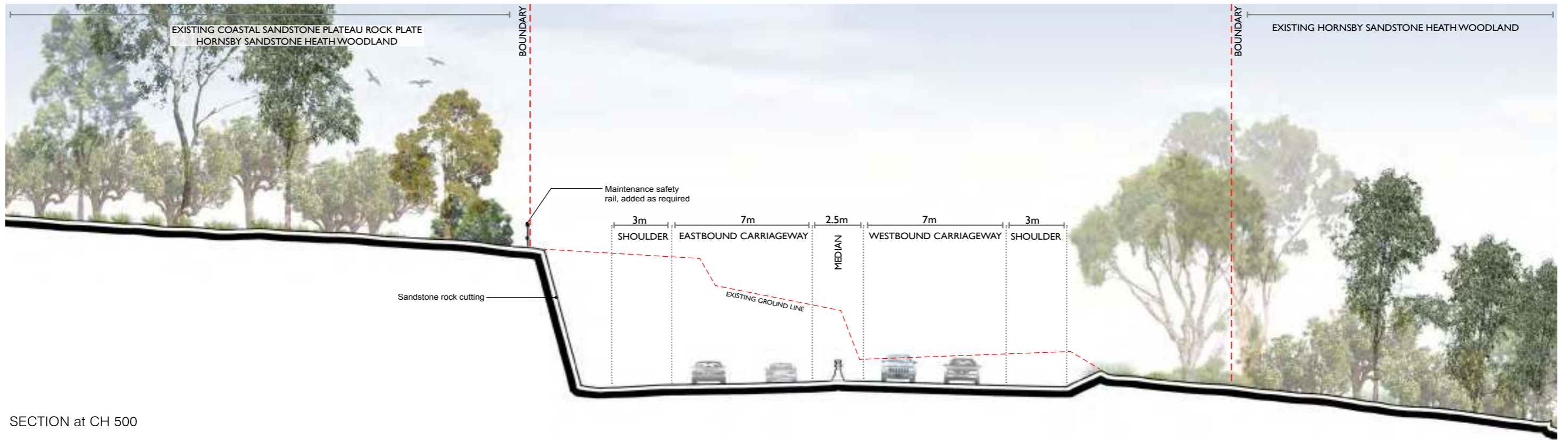


- - - PROJECT BOUNDARY
- TURF
- LOW NATIVE PLANTING
- MEDIAN PLANTING
- - - POTENTIAL NOISE WALL
- - - RETAINING WALL
- - - EXISTING POWER LINES
- PATH
- ↔ KEY VIEWS TO BE RETAINED
- HABITAT TREE SPECIES
- HABITAT TREE SPECIES AFFECTED BY NEW ROAD ALIGNMENT
REFER ECOSURE GE278V1_MP_010_HABITATTREES

Figures 6.2.1.1 Concept Plan 1



SECTION at CH200



SECTION at CH 500

Figures 6.2.1.2 Sections at Ch 200 and Ch 500



Vegetation

- + Minimise clearing of native vegetation and revegetate all bushland edges that are affected by construction.
- + Wherever possible, avoid impacts to heritage items and to habitat tree species that lie close to the corridor.
- + Provide native grasses to the verge and regenerate with native tree and shrub species beyond the required clear zone.
- + Stabilise and revegetate the required earth embankment batters with appropriate native species.
- + Reinforce screening with native planting to ensure privacy and to reduce the visual impact of the upgrade, particularly for properties at the north eastern end of Waratah Road.

Cuttings

- + Ensure that larger sandstone cuttings avoid benching. Do not use shotcrete to patch weak areas or at termination of cuttings. Carefully design the termination of cuttings to appear as natural as possible and use salvaged sandstone to make good areas where weak clay seams or floaters are found.

Views

- + Maintain district views over Ingleside valley to the south and south east.

Fauna

- + Carefully consider the alignment of fauna fencing to minimise its visual impact on Mona Vale Road and from residential areas.

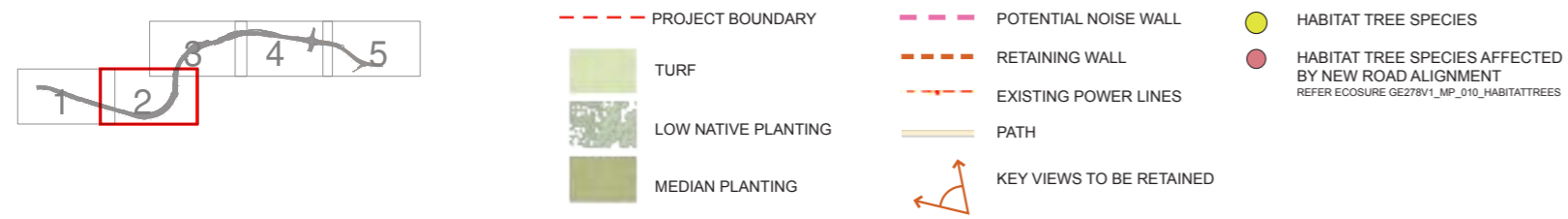
6.2.2 Concept Plan 2

Refer to Figures 6.2.2.1 to 6.2.2.2

Ingleside Road to Warriewood Escarpment (Ch. 600 - 1400)

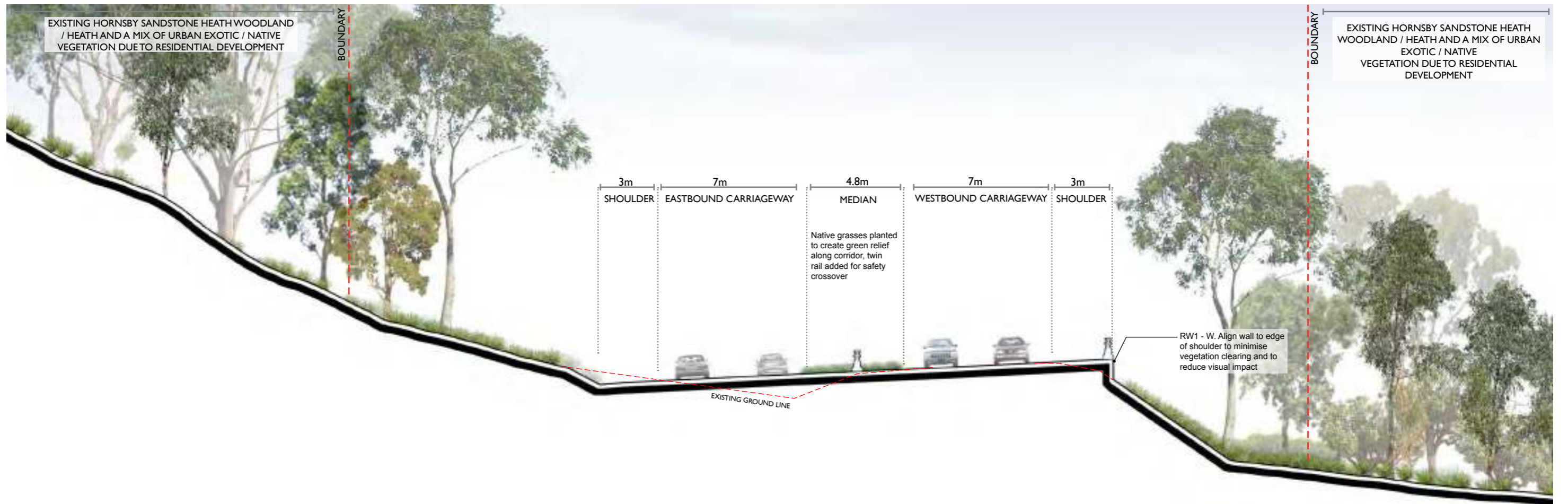
After Ingleside Road the bulk of the widening continues on the northern side of the existing road. The shoulder on the southern side does extend the footprint southwards though, necessitating some supporting earth embankments and a retaining wall as the road approaches the bend at Laurel Road East. Through the bend, a large, stepped sandstone cutting, with intermediate benching, occurs along the northern edge while another low retaining wall is proposed to the south at chainage 1200. A number of habitat tree species affected by the alignment have been identified here and roadside replanting should seek to compensate for these losses.

See over page for description of landscape proposal.

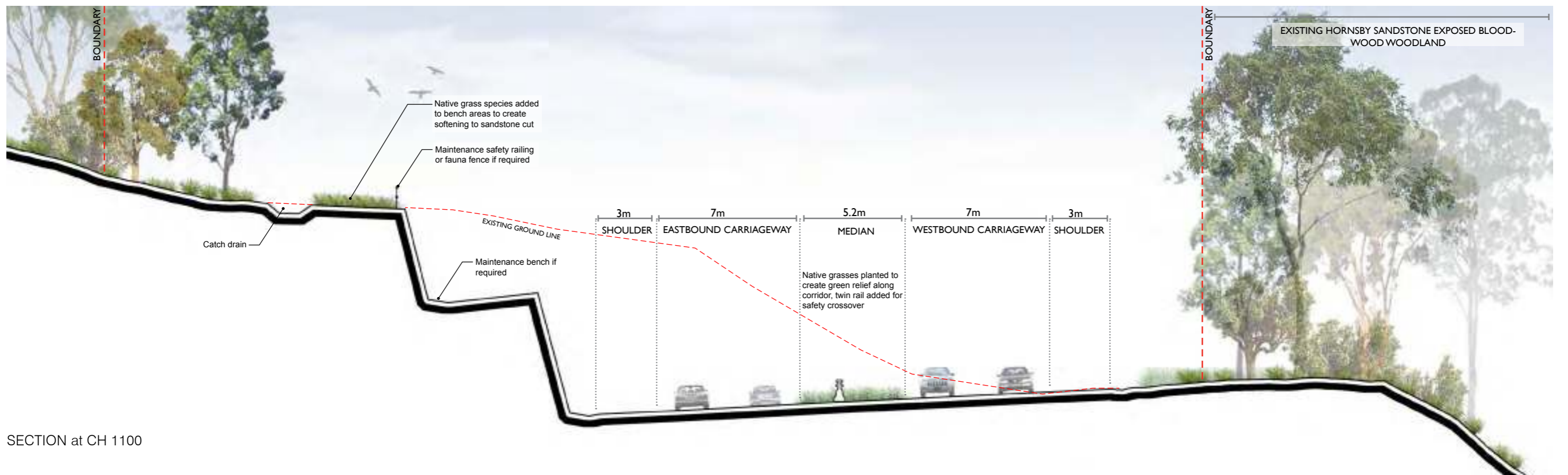


Figures 6.2.2.1 Concept Plan 2





SECTION at CH 900



SECTION at CH 1100

Figures 6.2.2.2 Sections at Ch 900 and Ch 1100



Vegetation

- + Minimise clearing of native vegetation and revegetate all bushland edges that are affected by construction.
- + Wherever possible, avoid impacts to heritage items and to habitat tree species that lie close to the corridor.
- + Provide native grasses to the verge and regenerate with native tree and shrub species beyond the required clear zone.
- + Stabilise and revegetate the required earth embankment batters with appropriate native species.
- + Reinforce screening with native planting to ensure privacy and to reduce the visual impact of the upgrade, particularly for properties to the south of the alignment along Laurel Road East.
- + Minimise the impacts to the existing vegetation in the design and construction of the retaining walls required.

Retaining Walls and Cuttings

- + Ensure that larger sandstone cuttings avoid benching. Do not use shotcrete to patch weak areas or at termination of cuttings. Carefully design the termination of cuttings to appear as natural as possible and use salvaged sandstone to make good areas where weak clay seams or floaters are found.
- + Align walls as close as possible to the edge of shoulders to minimise the footprint of the road and to reduce the visual impact of proposed walls on both sides of the alignment.
- + Consider the use of gabions for the low height retaining walls required.

Views

- + Maintain and enhance the views over coastline and Pacific Ocean to the east.

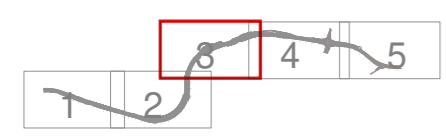
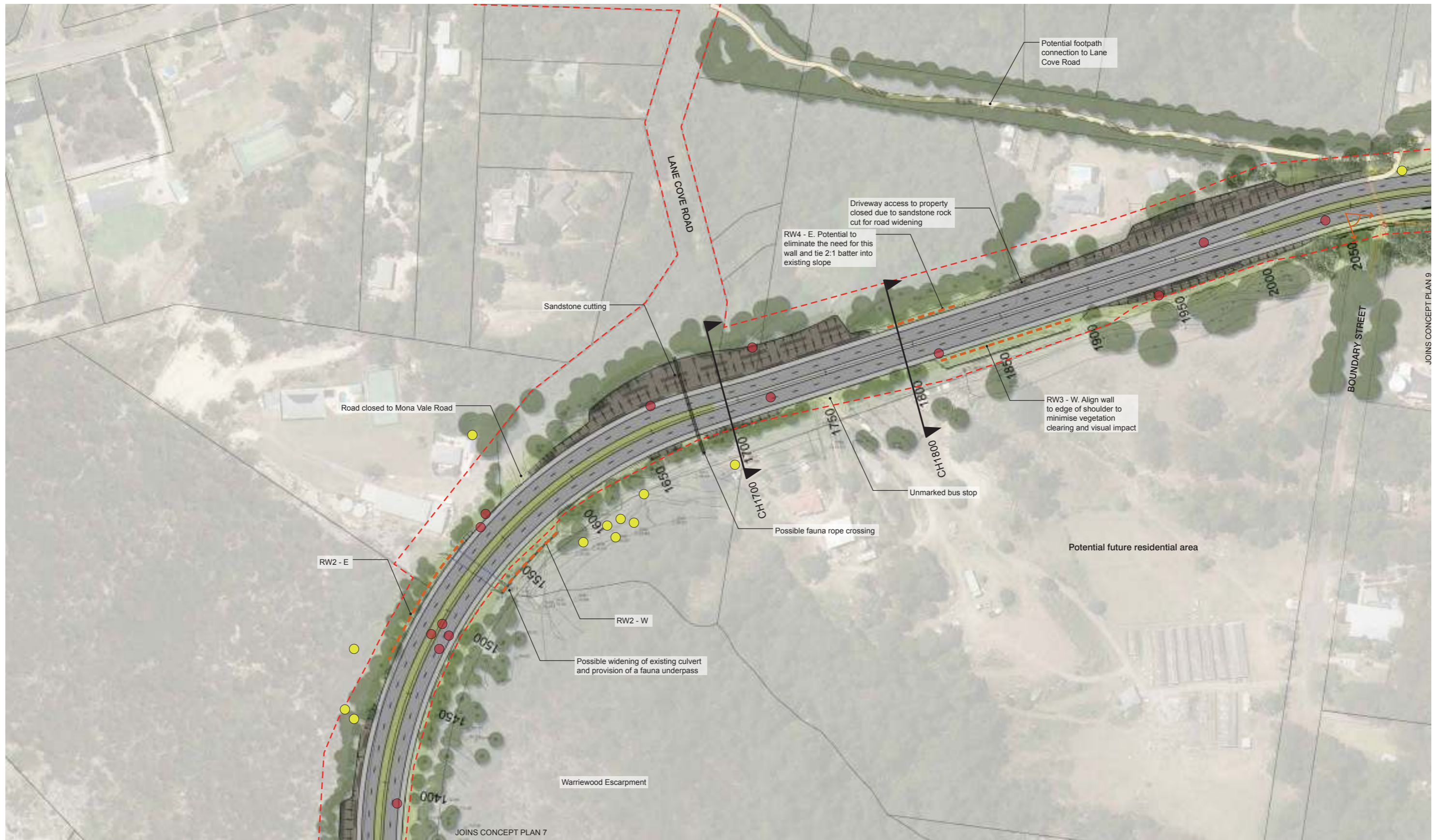
6.2.3 Concept Plan 3

Refer to Figures 6.2.3.1 to 6.2.3.2

Warriewood Escarpment to Boundary Street (Ch.1400 - 2050)

The widening continues to have the most significant impact on the northern side of the existing road where a series of major cuttings and smaller retaining walls occur along the edge of the widened road. The new cuttings will largely mimic the existing conditions while the retaining walls will not be visible from the road. Screening planting will be important however on the wall faces fronting adjacent properties. The road comes through two major cuttings as it reaches the bottom of the Warriewood Escarpment, where views to Mona Vale open up. The loss of large roadside trees on the northern side will open up the landscape further and revegetation will be important.

See over page for description of landscape proposal.

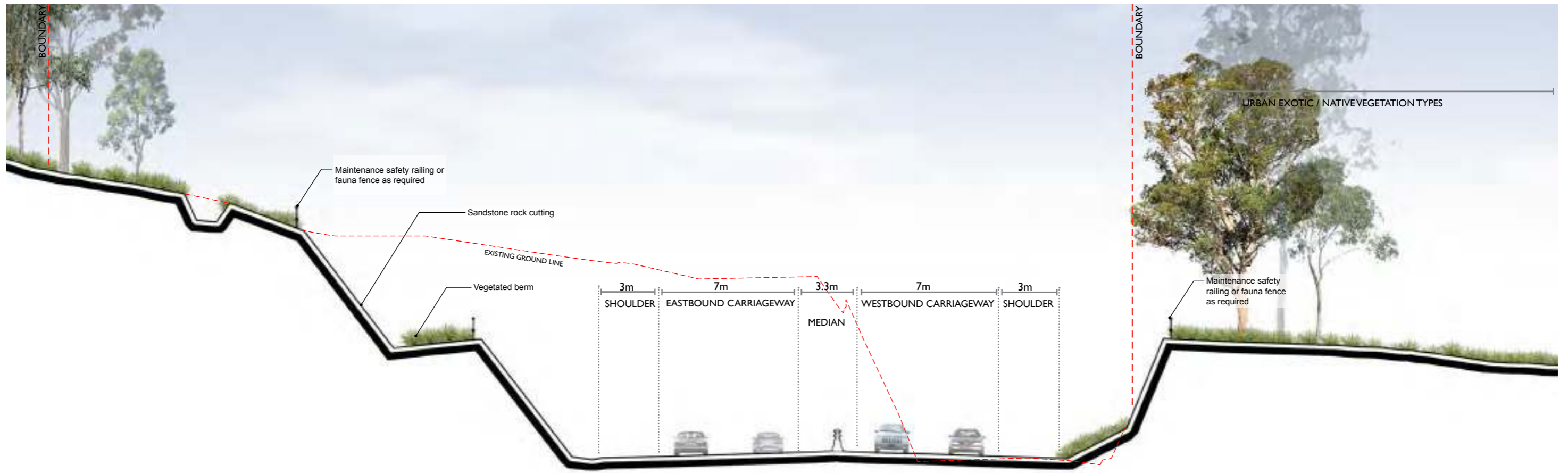


- - - PROJECT BOUNDARY
- TURF
- LOW NATIVE PLANTING
- MEDIAN PLANTING
- - - POTENTIAL NOISE WALL
- - - RETAINING WALL
- - - EXISTING POWER LINES
- PATH
- ↔ KEY VIEWS TO BE RETAINED
- HABITAT TREE SPECIES
- HABITAT TREE SPECIES AFFECTED BY NEW ROAD ALIGNMENT
REFER ECOSURE GE278V1_MP_010_HABITATTREES

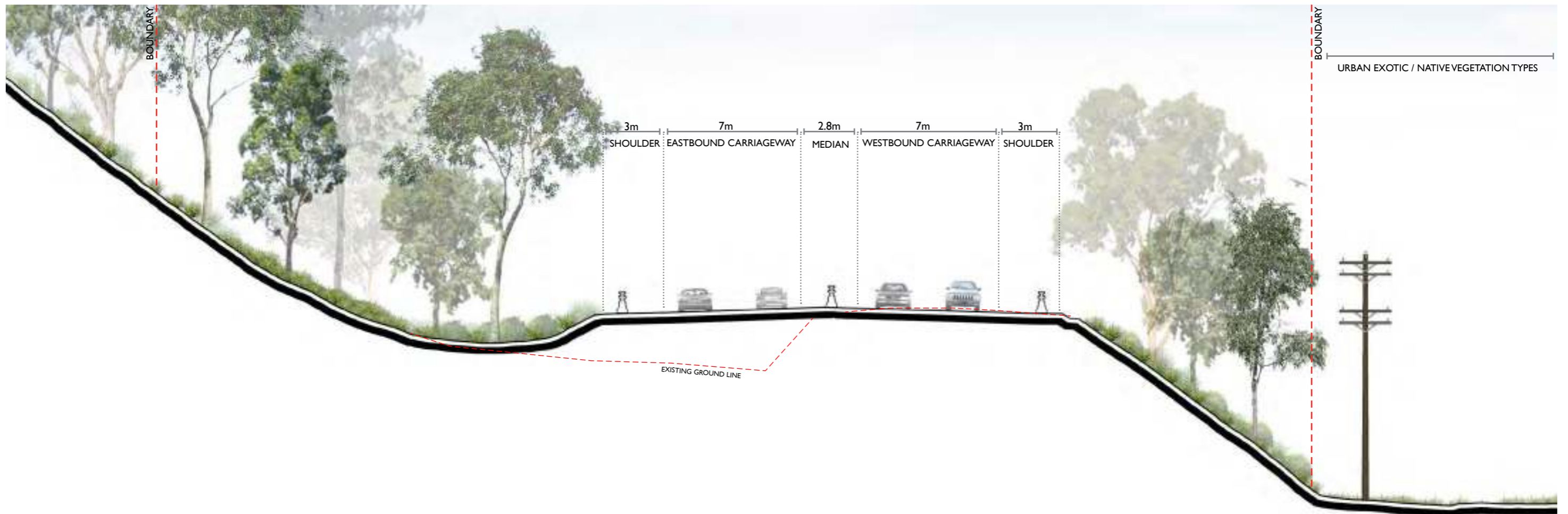
Figures 6.2.3.1 Concept Plan 3
 MONA VALE ROAD UPGRADE EAST: LANDSCAPE CHARACTER VISUAL IMPACT ASSESSMENT + URBAN DESIGN CONCEPT



JOINS CONCEPT PLAN 9



SECTION at CH 1700



Figures 6.2.3.2 Sections at Ch 1700 and Ch 1800



Vegetation

- + Minimise clearing of native vegetation and revegetate all bushland edges that are affected by construction.
- + Wherever possible, avoid impacts to heritage items and to habitat tree species that lie close to the corridor.
- + Provide native grasses to the verge and regenerate with native tree and shrub species beyond the required clear zone.
- + Stabilise and revegetate the required earth embankment batters with appropriate native species.
- + Minimise the impacts to the existing vegetation in the design and construction of the retaining walls required.
- + Provide screening trees and shrubs to the base of the retaining wall (RW2) to mitigate visual impacts to the property to the north west of the alignment.
- + Provide screening trees and shrubs to the base of retaining wall (RW3) to mitigate the impacts of the wall to the potential residential properties to the south.
- + Revegetate the road closure to Lane Cove Road to discourage vehicular access.
- + Maintain a landscape buffer to the potential future residential development to the south of the alignment.

Retaining Walls and Cuttings

- + Ensure that larger sandstone cuttings avoid benching. Do not use shotcrete to patch weak areas or at termination of cuttings. Carefully design the termination of cuttings to appear as natural as possible and use salvaged sandstone to make good areas where weak clay seams or floaters are found.
- + Align walls as close as possible to the edge of shoulders to minimise the footprint of the road and to reduce the visual impact of proposed walls on both sides of the alignment.
- + Consider the use of gabions for the low height retaining walls required.

Fauna

- + Investigate in detailed design potential means of fauna passage across the corridor.
- + Carefully consider the alignment of fauna fencing to minimise its visual impact on Mona Vale Road and from residential areas.

Views

- + Maintain and enhance the views over coastline and Pacific Ocean to the east.

Paths

- + Carefully consider the design of the potential footpath connection to Lane Cove Road. Design to integrate with the environment and minimise the tree clearing required.
- + Consider the potential of cyclist only access to and from Mona Vale Road at Lane Cover Road closure.

6.2.4 Concept Plan 4

Refer to Figures 6.2.4.1 to 6.2.4.2

From Chainage 2050 to Chainage 2560

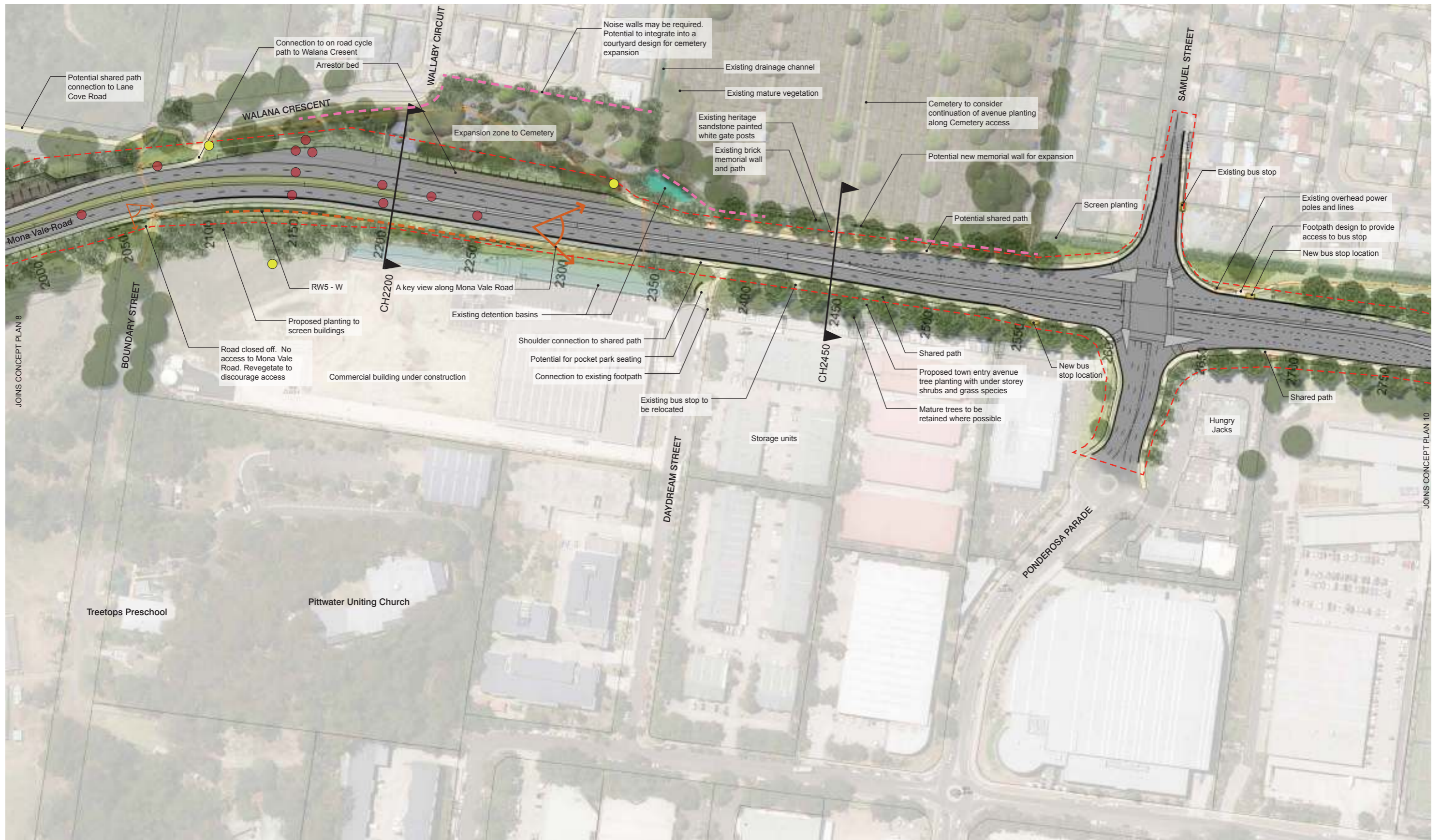
The road emerges at a rock cutting at Boundary Street and runs down to Ponderosa Parade. As it does so, the widening occurs on both sides of the alignment. To the north a widened shoulder (4.5 metres) that is supported by earth batters is proposed to function as a truck arrestor bed while opposite retaining walls sit below the southern edge of the road. Screening planting is proposed in front of these walls and the northern side embankments will be revegetated. A more formal avenue planting of contextually appropriate trees is proposed as a Mona Vale entry gesture in the vicinity of the cemetery and this may continue beyond Ponderosa Parade. The intersection at Ponderosa Parade is being upgraded to a fully signalised junction, with additional left hand turning lanes at each corner and bus stop bays. From the shoulder of the road a shared path link is proposed to Walana Crescent, which in turn has the potential to link with a possible shared path connection to Lane Cove Road. Similarly on the southern side a shared path connection is included from the road shoulder. Noise walls, if they are required adjacent to the cemetery, have the potential to form part of a courtyard landscape on the site earmarked for expansion of the cemetery.

Vegetation

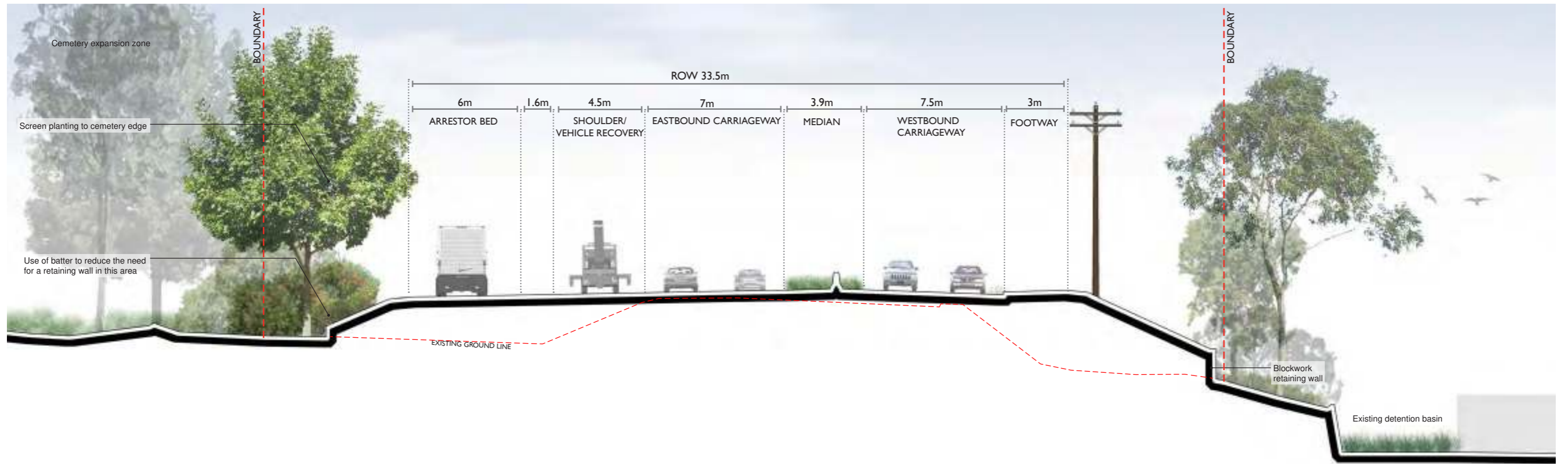
- + Minimise clearing of vegetation and revegetate all bushland edges that are affected by construction.
- + Wherever possible, avoid impacts to heritage items and to habitat tree species that lie close to the corridor.
- + Provide native grasses to the verge and regenerate with native tree and shrub species beyond the required clear zone.
- + Stabilise and revegetate the required earth embankment batters with appropriate native species.
- + Reinforce screening with native planting to ensure privacy and to reduce the visual impact of the upgrade particularly for properties to the north of the alignment along Walana Crescent.
- + At the new signalised intersection between Mona Vale Road and Ponderosa Parade provide screening shrubs and trees to the residential properties on the northern side. Provide appropriate edge treatments to Ponderosa Parade with tree and ground cover plantings that reflect the importance of this entrance to the commercial and light industrial area of Mona Vale.
- + Consider an entry avenue tree planting to both sides of Mona Vale Road as described in more detail in section 6.3.1.
- + Potential to provide a pocket park at the end of Daydream Street incorporating native trees and shrubs, seating and access to the proposed shared path.

Retaining Walls and Cuttings and Noise Walls

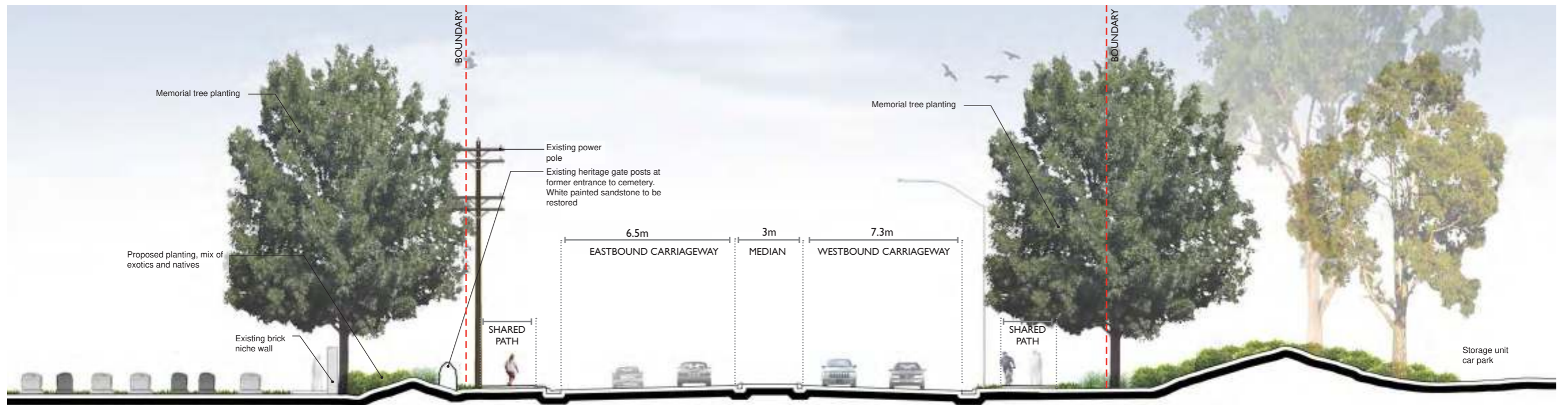
- + Ensure that larger sandstone cuttings avoid benching. Do not use shotcrete to patch weak areas or at termination of cuttings. Carefully design the termination of cuttings to appear as natural as possible and use salvaged sandstone to make good areas where weak clay seams or floaters are found.
- + Align retaining walls (RW5) as close as possible to the edge of the shoulder to minimise the footprint of the road and to minimise the visual impact of proposed walls on the south side of the alignment.
- + Should noise mitigation be required to the cemetery and the residential properties along Wallaby Circuit consideration should be given to the creation of a walled courtyard garden providing an attractive tranquil enclosure for the proposed gardens that form part of the cemetery expansion. Pedestrian and cyclist access can be provided through this space to reconnect with Mona Vale Road or provide access to the Cemetery.



Figures 6.2.4.1 Concept Plan 4



SECTION at CH 2200



SECTION at CH 2450

Figures 6.2.4.2 Sections at Ch 2200 and Ch 2450



Fauna

- + Investigate in detailed design possible widening of the existing culvert in the vicinity of chainage 2080 to provide fauna crossing point.
- + Carefully consider the alignment of fauna fencing to minimise its visual impact on Mona Vale Road and from potential views from south of the alignment.

Paths

- + Carefully consider the design and alignment of the multi-use path to minimise vegetation clearing and minimise gradients.
- + Provide a vehicle turnaround at the end of Walana Crescent that integrates the potential footpath from Lane Cove Road and the existing private driveways.
- + Provide provisions for cyclists to exit Mona Vale Road at Walana Crescent and consider the termination of the shoulder at this point. Cyclists can either utilise the service road adjacent of to the truck arrestor bed or reconnect to a shared path via the future expansion to the cemetery (TBA).
- + Provide a shared (off-road) path from Daydream Street to Ponderosa Parade. Access for cyclists to the shoulder can also be provided at this point.
- + Provide improved pedestrian and cyclist access along the frontage to Mona Vale Cemetery avoiding any impacts to the heritage listed sandstone gateposts and the memorial niche wall. In line with the Plan of Management for the Cemetery by Pittwater Council the original entrance to the Cemetery can be reinstated. If additional noise attenuation is required additional walls to match the existing niche wall can be designed.
- + Provide a safe and attractive footpath access from Samuel Street, east of Ponderosa Parade to Emma Street with an appropriate level of street lighting and a planting design that maintains clear sightlines. The placement of the required overhead powerlines is to be carefully considered to integrate with the planting design and to mitigate their visual impact.

Arrestor Bed

- + Provide an integrated design for the edge between the truck arrestor bed and the proposed cemetery expansion to screen the arrestor bed from the Cemetery and properties along Wallaby Circuit to the north. Noise mitigation measures can be potentially integrated into the design of this edge to provide further separation to the road.
- + The final design of the road in plan and cross section where the arrestor bed is proposed will be resolved in the detailed design of the project.

6.2.5 Concept Plan 5

Refer to Figures 6.2.5.1 to 6.2.5.2

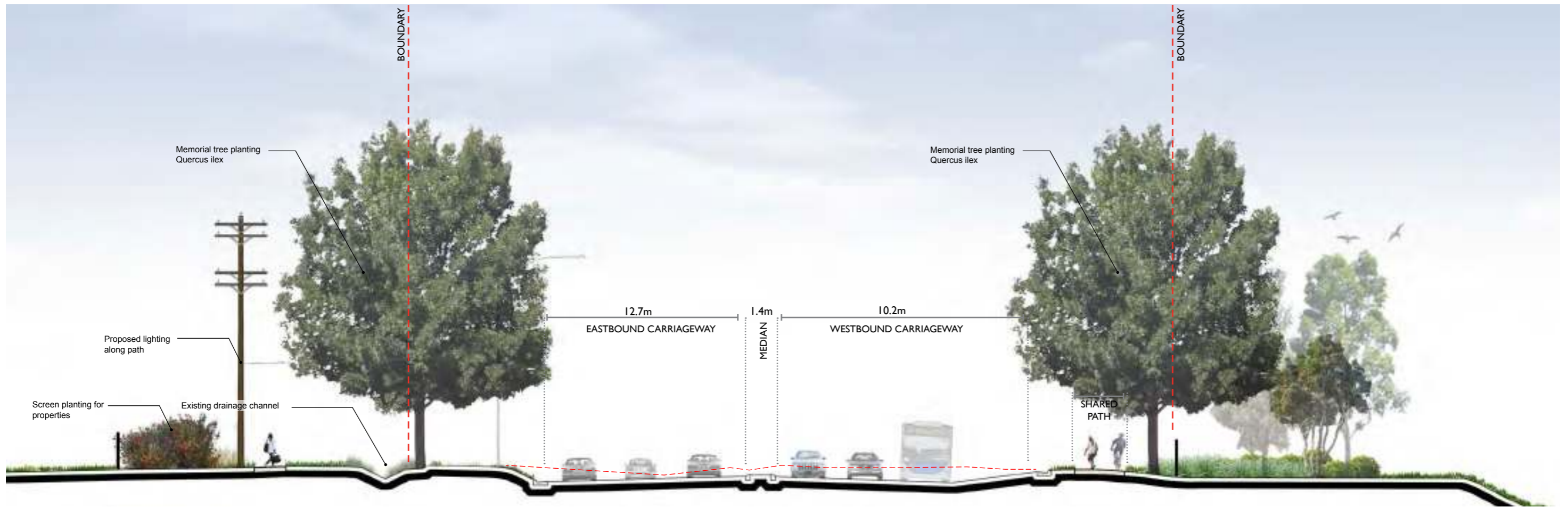
Ponderosa Parade to Foley Street (Ch. 2050 - 3217)

The Mona Vale Road widening takes place largely in the grassed verge to the south of the existing road between Ponderosa Parade and Foley Street. A shared path is proposed on both sides of the road, extending to Emma Street on the northern side and Foley Street on the south. The entry avenue planting could possibly be continued on the southern side, to extend the distinctive trees as far as the Pittwater RSL. On the northern edge there is limited scope for additional landscaping beyond Emma Street because of the narrowness of the verge and the presence of overhead wires.

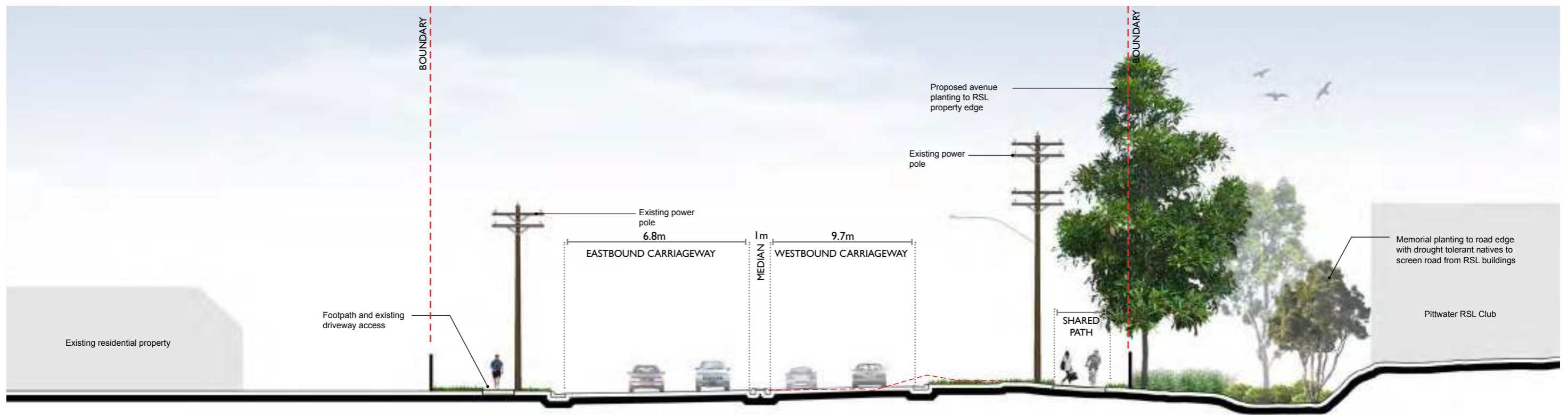
See over page for description of landscape proposal.



Figures 6.2.5.1 Concept Plan 5



SECTION at CH 2750



SECTION at CH 3000

Figures 6.2.5.2 Sections at Ch 2750 and Ch 3000



Vegetation

- + Retain existing trees where appropriate as marked on the plan.
- + Reinforce existing, and provide new screening with native planting to ensure privacy and reduce the visual impact of the upgrade to properties with rear boundaries facing the northern edge of the alignment, west of Emma Street.
- + Consider the design of a wide drainage swale to improve the existing open drainage channel to the west of Emma Street. This will provide the additional benefits associated with water sensitive urban design including improved water quality, provision of water to the trees and ground covers, slowing storm water flows and reducing the cost of maintenance of a conventional piped system.
- + Wherever possible, avoid impacts to heritage items and to habitat tree species that lie close to the corridor.
- + Consider an entry avenue tree planting to both sides of Mona Vale Road as described in more detail in section 6.3.1.
- + In consultation with Pittwater RSL provide an appropriate planting design for the Mona Vale Road frontage of the RSL land.

Paths

- + Carefully consider the design and alignment of the multi-use path to minimise vegetation clearing and minimise gradients.
- + Provide a shared path from Foley Street to Ponderosa Parade.
- + Provide safe and attractive footpath access from Samuel Street, east of Ponderosa Parade to Emma Street with an appropriate level of street lighting and a planting design that maintains clear sightlines. The placement of the required overhead power lines is to be carefully considered so as to integrate these with the planting design and mitigate their visual impact.

Miscellaneous

- + Potential to provide a suitable setting for the relocation of the signage for Pittwater RSL and the field artillery piece at the junction between Foley Street and Moan Vale Road.



Existing Conditions



Figure 6.2.6 Photomontage of potential avenue planting at Mona Vale

6.3 Planting Overview

6.3.1 Vegetation Types

The native vegetation communities across the project site cover a diverse closed heath and low eucalypt woodland assemblage generally found in the north east of Sydney. It is widely distributed above the northern beaches where a massive ramp of Hawkesbury Sandstone, known as the Hornsby Plateau, rises northwards until the Hawkesbury River. These sandstones are characterised by a series of rugged sandstone slopes and rocky benches which support only a skeletal and impoverished, sometimes poorly drained, sandy soil.

A dense heath community dominated by Heath-leaved Banksia, (*Banksia ericifolia* subsp. *ericifolia*), and Scrub She-oak (*Allocasuarina distyla*) occurs on exposed sites with a low, very open canopy of emergent eucalypts often present. The sclerophyllous shrub layer is very diverse with a range of other Banksia species, Tea-tree, Wattles, Hakeas, Grevilleas and Peas. There is variable cover of sedges and other monocots in the ground cover. Where present, the canopy includes stunted, sometimes mallee like, Red Bloodwood (*Corymbia gummifera*) and Scribbly Gums (*Eucalyptus haemastoma/Eucalyptus racemosa*). The Mallee Yellow-top Ash (*Eucalyptus luehmanniana*) occurs on very rocky, thin soils associated with sandstone benching.

Certain areas have been cleared for development at different periods and a mix of native and exotic plant species are found in these zones. Although much of the site is relatively weed free, due largely to its ridge top position at the top of the catchment, exotic weed species are present along certain sections of the alignment and should be cleared and replaced with appropriate native plants.

In the more urban area as the road enters Mona Vale, some exotic tree species have been suggested to be used in a possible entry avenue arrangement. These species, *Pinus pinea* (Stone Pine), *Populus alba* (Silver Poplar) and *Quercus ilex* (Holm Oak) have some association with memorial landscapes in Australia and particularly battlefields in Europe. They are suggested as species that might be appropriate given the proximity of the proposed avenue planting to the Mona Vale Cemetery and the Pittwater RSL's memorial space.

6.3.2 Screening Vegetation along Proposed Cuts, Earth Batters and Retaining Walls

Advanced large shrub and medium tree species are shown in informal bands and groupings. Plantings are proposed provide to screening/visual amelioration to the proposed retaining walls and some rock cuttings. It is intended that the larger trees in particular will provide shadow play on vertical surfaces, foiling the visual bulk of walls and cuttings. Batters at the road's edge and those associated with rock cuttings are to be revegetated with a low native shrub and grass mix.

Mixes of native grasses are planted in bands to allow clearances for maintenance access to structures along the alignment. Cuts immediately adjacent to the road are to be softened where possible with seeding to benches and batters using appropriate native species, suitable for clearance zones.

It is recommended that construction work zones through bushland areas be minimised during the construction of cuts and batters so as to maintain as much of the established environment as possible.

6.3.3 Screening Shrubs and Edge Treatments

Some areas along the alignment where significant new road-related elements are to be introduced require additional tree and shrub planting to reinforce already established screening. The landscape treatments proposed utilise a mix of native shrubs and groundcovers. Only native grasses and groundcovers are proposed along the road edge/verge to create a soft but relatively low maintenance zone that does not impede maintenance access.

6.3.4 Grasses and Groundcovers

Native ornamental grasses and mixed groundcovers provide the mass planting to the batters and verges. The species have been selected for their density, colour and form to maximise visual appeal for users of the corridor. Where narrow verges and planting beds occur, hardy grasses are to be planted with a mix of tubestock and semi-advanced pot sizes in order to provide more resilient planting with a better chance of establishment in what are typically harsh environments. The species have been selected for their low maintenance characteristics, forming dense clumps of planting that reduce weed growth and minimise the area where litter can collect.

6.3.5 Revegetation and Batter Stabilisation

The seed mixes proposed for the revegetation of soil batters include endemic shrubs, tussocks, grasses and groundcovers, used for the purpose of rapid coverage and bank stabilisation. There are no tree species included in these mixes because in the areas where the mixes are used, trees may be unsuitable. In areas earmarked for seeding where trees are required, they are planted over the seed mix. Two seed mixes are suggested; a frangible shrub seed mix and a native grass seed mix. Seeding is more effective in maximising species diversity and thereby approximating the species composition of the local flora.

6.3.6 Median Planting

Where conditions allow, planting in the medians will include densely planted low level native grasses and groundcovers, helping to soften the visual impact of large expanses of road surface.

Note: All planting throughout the medians have taken into consideration Roads and Maritime Services clear zones and maintenance access requirements, particularly with regard to foliage overhanging the road, and the encroaching of shrubs over the kerblines. The final road design will determine the extent of central barriers and the extent of the median planting may need adjustment as a result.

6.3.7 Indicative Planting Palette

Botanical Name	Common Name	Mature Height	Mature Spread
Trees			
<i>Acmena smithii</i>	Lillypilly	5m	3m
<i>Elaeocarpus reticulatus</i>	Blueberry Ash	8m	7m
<i>Eucalyptus gummiifera</i>	Red Bloodwood	20m	10m
<i>Eucalyptus haemastoma</i>	Scribbly Gum	7m	4m
<i>Glochidion ferdinandi</i>	Cheese Tree	10m	12m
<i>Leptospermum trinervium</i>	Paperbark Tea-tree	3m	2m
<i>Livistona australis</i>	Cabbage Tree Palm	15m	4m
<i>Pinus pinea</i> *	Stone Pine	12m	7m
<i>Populus alba</i> *	Silver poplar	20m	6m
<i>Quercus ilex</i> *	Holm Oak	20m	15m
<i>Tristanopsis laurina</i>	Water Gum	7m	5m
Shrubs			
<i>Banksia 'Giant Candles'</i>	Banksia	5m	2.5m
<i>Banksia oblongifolia</i>	Banksia	1.5m	1.5m
<i>Callistemon salignus</i>	Bottle Brush	3-4m	3m
<i>Dodonaea triquetra</i>	Hop Bush	3m	2m
<i>Grevillea sericea</i>	Grevillea	2m	2m
<i>Melaleuca hypericifolia</i>	Melaleuca	3m	2m
<i>Personia levis</i>	Borad-leaved Geebung	4m	2m
<i>Rosmarinus officinalis</i>	Rosemary	1.5m	1.5m
<i>Telopea speciosissima</i>	Waratah	3m	2m
<i>Westringia fruticosa</i>	Coastal Rosemary	1m	1m
<i>Zieria smithii</i>	Sandfly Bush	2m	1.5m
Grasses & Groundcovers			
<i>Actinotus helianthi</i>	Flannel Flower	0.3m	0.4m
<i>Asplenium flabellifolium</i>	Necklace Fern	0.2m	0.5m
<i>Carex appressa</i>	Tall Sedge	1m	0.7m
<i>Dianella caerulea</i>	Blue Flax Lilly	1m	1.5m
<i>Ficinia nodosa</i>	Knobbly Club Rush	1m	1m
<i>Gahnia sieberana</i>	Red-fruited Sword Sedge	1.5m	2m
<i>Hardenbergia violacea</i>	False Sarsaparilla	0.2m	3m
<i>Lomandra longifolia</i>	Mat Rush	0.6m	1m
<i>Poa affinis</i>	Native Poa Grass	0.8m	0.8m
<i>Rosmarinus officinalis</i> *	Rosemary	1.5m	1.5m
<i>Themeda australis</i>	Kangaroo Grass	1m	0.3m

* Mona Vale Avenue entry planting



Acmena smithii

Lillypilly



Leptospermum trinervium

Paperbark Tea-tree



Tristaniopsis laurina

Water Gum



Grevillea sericea

Grevillea



Westringia fruiticosa

Coastal Rosemary



Dianella caerulea

Blue Flax Lily



Poa labillardieri 'Eskdale'

Tussock Grass



Elaeocarpus reticulatus

Blueberry Ash



Livistona australis

Cabbage Tree Palm



Banksia 'Giant Candles'

Banksia



Melaleuca hypericifolia

Melaleuca



Zieria smithii

Sandfly Bush



Ficinia nodosa

Knobby Club Rush



Themeda australis

Kangaroo Grass



Eucalyptus gummiifera

Red Bloodwood



Pinus pinea

Stone Pine



Banksia oblongifolia

Banksia



Persoonia levis

Borad-leaved Geebung



Actinotus helianthi

Flannel Flower



Gahnia sieberana

Red-fruited Sword Sedge



Eucalyptus haemastoma

Scribbly Gum



Populus alba

Silver Poplar



Callistemon salignus

Bottle Brush



Rosmarinus officinalis

Rosemary



Asplenium flabellifolium

Necklace Fern



Hardenbergia violacea

False Sarsaparilla



Glochidion ferdinandi

Cheese Tree



Quercus ilex

Holm Oak



Dodonaea triquetra

Hop Bush



Telopea speciosissima

Waratah



Carex appressa

Tall Sedge



Lomandra longifolia

Mat Rush

6.4 Design Criteria for Structures and Components

6.4.1 Design Criteria for Retaining Walls

Retaining walls are expected in the following six locations:

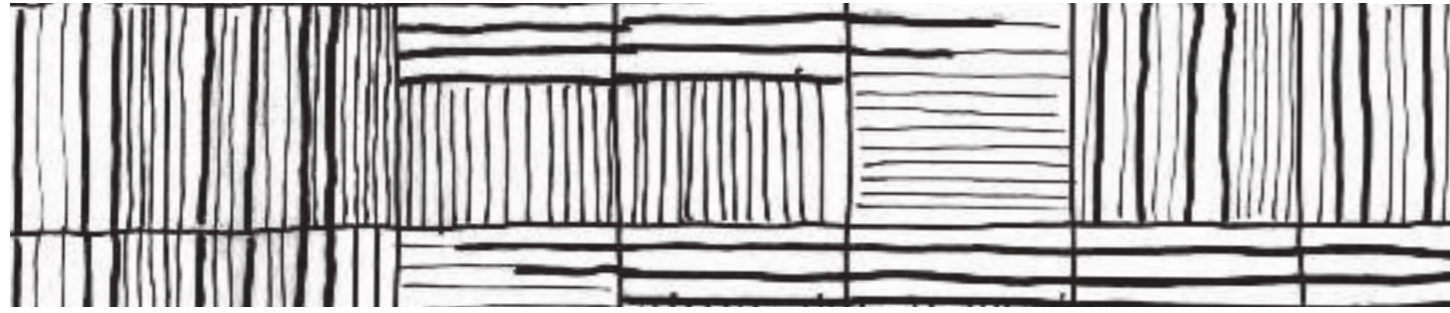
- + Wall Number RW1- W – Adjacent to the westbound carriageway between Ingleside Road and Laurel Road East (approximately 115metres long and a maximum height of 4.5m).
- + Wall Number RW2- W – adjacent to the westbound carriageway east of Laurel Road East (approximately 37.5metres long and a maximum height of 1.5m). Note – the need for this retaining wall is to be confirmed.
- + Wall Number RW2 - E – adjacent to the eastbound carriageway west of Lane Cove Road (approximately 77.5metres long and a maximum height of 6.3m).
- + Wall Number RW3 - W – adjacent to the westbound carriageway west of Boundary Street (approximately 65metres long and a maximum height of 3m).
- + Wall Number RW4 - E – adjacent to the eastbound carriageway east of Lane Cove Road (approximately 25metres long and a maximum height of 3m).
- + Wall Number RW5 - W – adjacent to the westbound carriageway between Boundary Street and Daydream Street (approximately 180metres long and a maximum height of 3.8m).

The retaining walls required are all in fill situations, most face bushland and are not visible from the highway. Retaining walls RW2 and RW5 are visible from adjoining properties. A blockwork finish to RW5 would be appropriate due to its position in relation to the blockwork walls of the retaining wall adjacent to the detention basin.

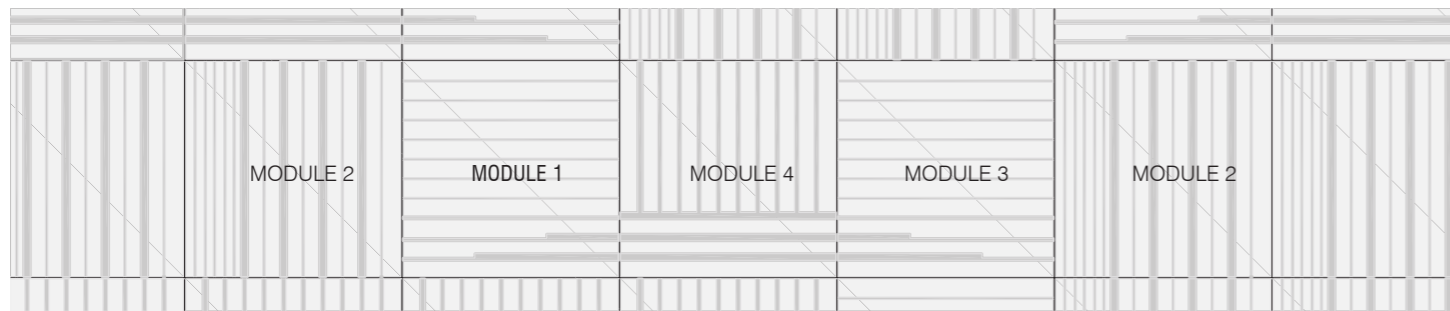
For the visually prominent reinforced soil walls the conceptual approach for the concrete facing panels is detailed in 6.4.1.1. The concrete facing panels reference the sandstone cuttings that are a strong feature of this section of Mona Vale Road. The panels form a 2 metre by 2 metre grid with the joints between panels incorporated into the detailed patterning of the concrete surface. The design relies on a non-staggered concrete panel system and this allows for parallel vertical and horizontal joint lines that can then be integrated into the wider design. The design employs a 4 panel module system mounted in a predetermined compositional pattern to achieve variation across a given retaining wall. The variation in the pattern on the four panel types is achieved through rebated lines that are either 20, 40 or 60mm in width. This inscribing of the panels is designed as an abstract allusion to the marks in sandstone cuttings – the vertical marks created by the splitting or cutting of the rock face and the horizontal seams that occur naturally in the sandstone. This subtle surface pattern and texture is intended to mediate the perceived scale of the retaining walls and assist in helping these structures recede as background elements in the bushland context.

The following design criteria apply:

- + Reinforced soil wall with concrete facing panels to be designed with explicit reference to sandstone cuttings - this is to be achieved with an abstract concept
- + Precast concrete facing panels with a strong pattern and texture to discourage graffiti.
- + Patterns with a combination of smooth and rough surface textures to discourage graffiti and reduce the visual scale of the wall.
- + Dark colours to assist in reducing the visual impact by blending the wall into its landscape context and preventing unnecessary glare from the northern sunlight.
- + Wall terminations that appear to disappear into the ground. Ensure the wall is designed to extend as far as is required to achieve this.
- + Fixings that are concealed and discreet.
- + Where retaining walls are located adjacent to the shared path provide an open, transparent fence to maintain openness and views for shared path users.
- + If a noise wall is required and is less than 1200mm in height, integrate the noise barrier with the retaining wall design to form one aesthetic composition.
- + Provide planting in front of the wall to soften its appearance and reduce the visual impact.
- + A consistent retaining wall design finish should be used for both the east and west upgrades.



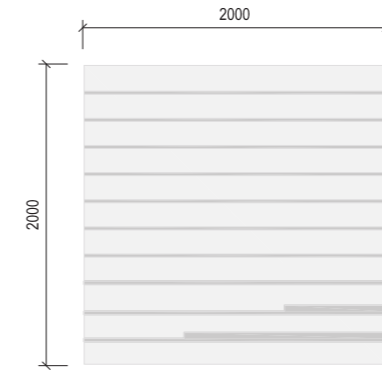
CONCEPT SKETCH FOR CONCRETE FACING PANELS



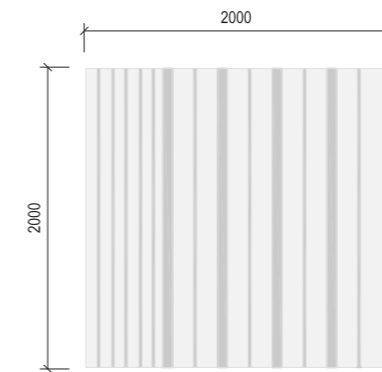
POTENTIAL DESIGN COMPOSITION FOR CONCRETE FACING PANELS



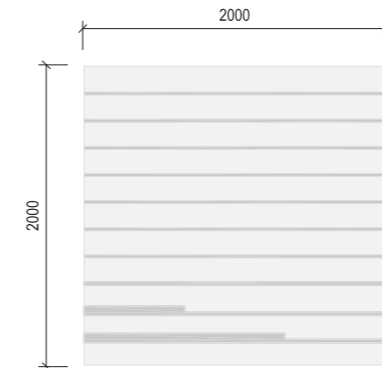
SECTIONAL ELEVATION DEPICTING POTENTIAL COMPOSITION OF REINFORCED SOIL WALL WITH CONCRETE FACING PANELS IN LANDSCAPE CONTEXT



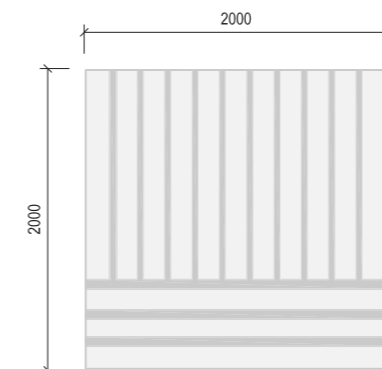
MODULE 1



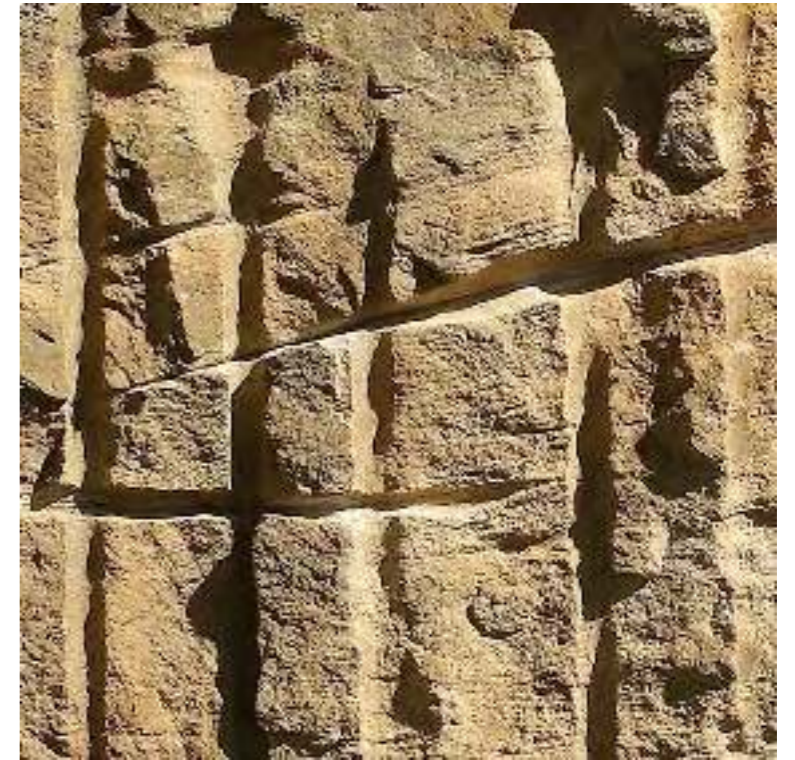
MODULE 2



MODULE 3



MODULE 4



REFERENCE IMAGE: SANDSTONE CUTTING WITH VERTICAL SAW CUTS



REFERENCE IMAGE: SANDSTONE CUTTING WITH VERTICAL SAW CUTS

Figure 6.4.1.1 Reinforced Soil Wall Panels Concept

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6.4.2 Design Criteria for Cuttings

A number of large cuttings are required along the alignment and will form distinctive, visually prominent elements. The existing sandstone cuttings along the alignment help to define the character of the road. Due to the high quality of the sandstone the cuttings can be steep, thereby minimising the construction footprint required.

The following design criteria apply:

- + Tall near vertical cuttings are desirable where the rock strength allows
- + Avoid benching where possible to minimise the construction footprint
- + Avoid the use of shotcrete. If shotcrete is required a suitable minimisation strategy should be developed by the design team.
- + Cuttings should be designed to be as natural looking as possible.
- + Feather the ends of the cuttings into the natural environment
- + Catch drains are to be hidden as far as possible
- + Solid sandstone blockwork or stone pitching should be considered for highly visible areas where stabilisation is required.

NOTE: New and extended cuttings through areas of sandstone rock shall be carried out using methods that guarantee successful salvage of sandstone block and facing material of suitable size, even shape and good condition for use where required in cuttings and/or on embankments.

6.4.3 Design Criteria for Noise Walls (if required)

Noise barriers may be required on the Mona Vale Road (a detailed acoustic assessment is being proposed as part of the REF). The following design criteria would apply should noise walls be a necessary part of the Mona Vale Road upgrade design:

- + Limit the number of noise barrier types to provide consistency and to simplify the look and identity of the Highway.
- + Noise barriers are to be streamlined in plan. All angles to be smoothed off to create soft sinuous curves.
- + Noise barriers are to run parallel to the road edge. If this is not possible a smooth exit and return curve is required.
- + Barrier heights to be rationalised to limit the number of height changes. A consistent top edge line is required.
- + Avoid stepping of the top edge wherever possible. Tilt panels so that they run parallel to the ground plane. Consider impacts of fixing details at the post.
- + The appearance of both sides of the noise barrier should be of equivalent design quality.
- + Fixing systems and footings must be concealed.
- + Provide an end treatment which is integral with the barrier design and responsive to the context of the termination point.
- + Should noise walls be required along the Cemetery frontage these should be designed to be in keeping with the existing niche wall and integrated into the design of the proposed Cemetery expansion.
- + Maximise the opportunities for planting to screen walls and to help deter graffiti.

6.4.4 Design Criteria for Bus Stops and Shared Paths

6.4.4.1 Bus Stops

There are four existing bus stops within the proposal corridor that require relocation, two on the westbound (south) side of the highway, one on the eastbound (north) side and one along Samuel Street. All the stops have the same shelters and are suitable for reuse. They have a metal roof and two timber bench seats. Currently, some of the shelters do not have compliant mobility-impaired access.

These bus stops are to be incorporated into the alignment of the proposed shared path and footpath network and would be serviced directly from the proposed bus bays. All bus stops are to have mobility-impaired access in accordance with the 'Disability Discrimination Act' (1992) and 'Disability Standards for Public Transport' (2002). Refer to Figure 6.4.4.2.

The following design criteria apply:

- + Bus stops shall be designed in accordance with the 'STA Bus Infrastructure Guide' (2011) document.
- + Bus stops shall be arranged to ensure a minimum 2.5 metres clear width where possible for adjacent shared paths to allow continuity and ensure clearance for cyclists and pedestrians to pass safely.
- + Bus stop structures shall be positioned on the departure side of vehicle accessways to maintain adequate clearance and sightlines for vehicle access to and from existing residential driveways.



6.4.5.2 Shared Paths

A shared path is proposed along Mona Vale Road from Foley Street to Daydream Street on the westbound (south) side of the alignment and from Walana Crescent to Samuel Street on the eastbound side. The existing footpath from Samuel Street to Emma Street running east along Mona Vale Road will be realigned. A potential footpath connection is also being considered from Walana Crescent to Lane Cove Road.

In addition to providing safe and easy access to the relocated bus stops along Mona Vale Road, the shared path will function as a key cycle and pedestrian route between the residential and commercial areas of Mona Vale.

The following design criteria apply:

- + Maintain a typical width of 3.5 metres with a minimum clear width of 2.5 metre around structures and signage where possible.
- + Ensure clear sightlines to adjacent vehicle accessways and pedestrian paths by limiting planting to a maximum of 1 metre in height in these areas.
- + Where shared paths and footpaths are located adjacent to retaining walls or steep embankments, a safety railing shall be provided. Where a shared path is less than 1.0 metre from the back of kerb incorporate the area between the shared path and kerb into the shared path rather than having a narrow planting strip.
- + Maximise shade planting to paths and extent of landscape buffers where possible.



+ 7.0 Mitigation

The Visual Impact Assessment process brings to light a variety of mitigation measures that have the potential to locally mediate the effects of the road widening. Some measures will help to better integrate the road with its surroundings and others should help to reduce its visual impact. These mitigation measures include:

- + Re-use of cut sandstone material where feasible in the construction of retaining walls or as wall or abutment cladding.
- + Revegetation of disturbed areas during construction activities using locally appropriate, endemic trees and shrubs.
- + New and additional landscaping to screen the roadway and associated structures from neighbouring residential areas.
- + Planting to embankments and in front of retaining walls to soften the appearance and reduce the visibility and perceived scale of engineered and constructed elements.

Refer Table 7.1 MitigationTable

The concept design responds to the overall proposal objectives and is underpinned by a set of urban design objectives and more specific principles. The concept design on the preceding pages illustrates the application of these objectives to the site and the proposed alignment of the Mona Vale Road East Upgrade. It adopts the mitigation measures detailed in the table below, integrating them into a coherent urban and landscape composition for the corridor.

Table 7.1 Mitigation Table

Location	Issue	Mitigation
Chainage 0: VP1 Looking east towards the junction between Mona Vale Road, Lane Cove Road and Manor Road.	Widening of the Mona Vale Road alignment, providing two additional lanes, resulting in a loss of some vegetation.	Provide clusters of native shrub and tree planting, taking into account requirements for sightlines and clear zones,
Chainage 35: VP2 Looking west along Lane Cove Road towards the junction with Mona Vale Road.	Widening of the Mona Vale Road alignment, providing two additional lanes, resulting in a loss of some vegetation.	Provide clusters of native shrub and tree planting, taking into account requirements for sightlines and clear zones.
Chainage 220: VP3 Looking north east along Waratah Road towards Mona Vale Road.	The widening of Mona Vale Road on the southern edge by approximately 4-5m from the existing road edge will result in the removal of existing vegetation.	Provide clusters of native shrub and tree planting, taking into account requirements for sightlines and clear zones.
Chainage 720: VP4 Looking west along Mona Vale Road.	Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. The widening requires the clearing of existing vegetation.	Visual impact can be further reduced by providing replacement tree planting along road margin embankments while maintaining clear zone requirements.

Location	Issue	Mitigation
<p>Chainage 740: VP5 Looking east along Mona Vale Road.</p>	<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. A retaining wall is required along and below the westbound carriageway facing the bushland. The wall will not be visible from this view point. The widening requires the clearing of existing vegetation.</p>	<p>Retain as many significant trees as possible beyond the zone of construction and provide clusters of native shrub and tree planting within disturbed areas.</p>
<p>Chainage 725: VP6 Looking northwest towards Mona Vale Road from Ingleside Road.</p>	<p>The widening of Mona Vale Road on the southern edge by approximately 4m from the existing road edge will result in the loss of vegetation that may result in the proposal becoming more visible.</p>	<p>Retain as many significant trees as possible beyond the zone of construction and provide clusters of native shrub and tree planting within disturbed areas.</p>
<p>Chainage 950: VP7 Looking east along Mona Vale Road (toward sandstone cutting on left).</p>	<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. The existing cutting will be widened to the north and will reach a significant height with a bench required.</p>	<p>The visual mitigation requirement is limited as this cutting will result in a wider version of the existing cutting, however retention of as many significant trees as possible beyond the zone of construction will minimise impacts to the existing bushland setting.</p>
<p>Chainage 1040: VP8 Looking east along Mona Vale Road at the ridgeline with coastal views to the east.</p>	<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. The existing cutting will be widened to the north and will reach a significant height with a bench required.</p>	<p>The visual mitigation requirement is limited as this cutting will result in a wider version of the existing cutting, however retention of as many significant trees as possible beyond the zone of construction will minimise impacts to the existing bushland setting. The widening will occur on the inside curve and away from the escarpment edge, meaning coastal views will remain as they are.</p>
<p>Chainage 1560: VP9 Looking southwest towards Mona Vale Road from Lane Cove Road.</p>	<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. A retaining wall and new culvert will be required and widening of the existing cutting. Potential location of fauna fencing.</p>	<p>Visual impact can be further reduced by providing appropriate detailing to the retaining wall structure and planting along road margins to screen the wall and culvert structure as far as practicable given space limitations and clear zone requirements.</p>
<p>Chainage 1550: VP10 Looking south along Mona Vale Road from the junction with Lane Cove Road.</p>	<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. A retaining wall and new culvert will be required but these will not be visible from the road. Significant clearing will be required during construction of the road. Potential location of fauna fencing.</p>	<p>The widening occurs to the north of the alignment away from the edge of the escarpment, limiting the impact beyond the road corridor to the east. Provide clusters of native shrubs and trees to disturbed areas. Visual impact can be further reduced by providing appropriate detailing to the retaining wall structure and planting along the frontage of the wall and culvert area.</p>

Location	Issue	Mitigation
Chainage 1560: VP11 Looking east along Mona Vale Road from the junction with Lane Cove Road.	The widening will require a substantial cutting to the north of the current alignment.	The cutting is likely to be sandstone so should blend in with the current landscape character. This cutting can be further mitigated by native tree and shrub planting.
Chainage 2070: VP12 Looking north along Boundary Street towards the Mona Vale Road.	The widening will require a retaining wall to the south of the current alignment facing the view point.	Provide native buffer planting to limit views of the retaining wall and embankment from future residential properties.
Chainage 2145: VP13 Looking north towards Mona Vale Road from the Uniting Church car park.	The widening will require a substantial retaining wall to the south of the current alignment facing the view point. A substantial amount of clearing of existing trees and shrubs currently screening the alignment will be required.	There is currently a commercial development under construction in this location which has already had a significant effect on the local landscape character. The retaining wall required will sit behind the existing retaining wall facing the commercial development and will be for the most part hidden from this view point. The wall will be designed to be in keeping with the context and mitigated with planting.
Chainage 2090: VP14 Looking west along Mona Vale Road from the junction with Boundary Street.	The widening will require a substantial cutting to the north of the current alignment. A significant amount of vegetation clearing is required.	Visual impact can be reduced by providing replacement tree planting along road margin embankments while maintaining clear zone requirements.
Chainage 2150: VP15 Looking west along Mona Vale Road from transition of landscape character zones 6 & 7	Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. The proposed provision of an arrestor bed to the north of the current alignment.	Visual impact can be reduced by providing replacement shrub and tree planting along road margin embankments while maintaining clear zone requirements.
Chainage 2150: VP16 Looking east along Wallana Crescent.	The widening of Mona Vale Road and the proposed provision of an arrestor bed.	Replacement tree planting as part of a sensitive design for the arrestor bed with vegetated earth mounding, to divide the expanse of hard surface required by the arrestor bed in this location.
Chainage 2250: VP17 Looking south along Wallaby Circuit towards Mona Vale Road.	The widening of Mona Vale Road and the proposed provision of an arrestor bed.	Replacement tree planting as part of a sensitive design for the arrestor bed with vegetated earth mounding, to divide the expanse of hard surface required by the arrestor bed in this location.
Chainage 2370: VP18 Looking north from Daydream Street towards Mona Vale Road.	Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier. Most of the widening occurs on the southern side of the alignment towards the view point. A footpath connection is provided to Daydream Street.	Provide street tree and ground cover planting along the alignment, in accordance with Council's preferred street tree species list.

Location	Issue	Mitigation
<p>Chainage 2360: VP19 Looking west from the verge along the southern side of Mona Vale Road adjacent to Daydream Street.</p>	<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a low concrete median barrier.</p> <p>A retaining wall may be visible between the alignment and the existing detention basin. The arrestor bed may also be visible across the street from this view point.</p>	<p>Provide screen planting to alignment verges. Screen planting may also mitigate the view of the arrestor bed taking into account requirements for sightlines and clear zones.</p>
<p>Chainage 2380: VP20 Looking east, from the verge along the southern side of Mona Vale Road adjacent to Daydream Street.</p>	<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a low concrete median barrier.</p> <p>The removal of the existing grass verge and vegetation to provide the additional lanes and footpath. Impacts to the cemetery (opposite) are kept to a minimum.</p>	<p>Low groundcover and feature street tree planting (in accordance with Council's street tree preferred species list) in the verge where clear zone requirements permit would help to recreate the visual character currently lost.</p>
<p>Chainage 2470: VP21 Looking east, from the verge along the southern side of Mona Vale Road adjacent to the commercial area between Daydream Street and Ponderosa Parade</p>	<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a twin steel rail and concrete median barrier.</p> <p>While it is already a two lane highway with the commercial area to one side, the heritage listed Cemetery is located opposite.</p> <p>Some vegetation may be lost along the frontage to the Cemetery.</p>	<p>Provide tree and shrub planting where constraints allow. Impacts to the cemetery should be kept to a minimum.</p> <p>Low groundcover and feature street tree planting in the verge where clear zone requirements permit would help to maintain the existing vegetated corridor character.</p>
<p>Chainage 2530: VP22 Looking west along Mona Vale Road.</p>	<p>Widening of the existing Mona Vale Road to provide two lanes in each direction with 3m shoulders and a concrete median. Removal of the existing grass verge and vegetation to provide the additional lanes and footpath.</p>	<p>Provide low groundcover and feature street tree planting in the verge where clear zone requirements permit, and in accordance with Council's preferred street tree species list.</p>
<p>Chainage 2680: VP23 Looking east along Mona Vale Road across the existing roundabout at the junction with Ponderosa Parade and Samuel Street.</p>	<p>Widening of the existing Mona Vale Road to provide two lanes in each direction divided by a concrete median with additional widening at the junction.</p> <p>The roundabout will be replaced with a signalised intersection.</p> <p>Footpaths and planting including Memorial plantings will also be visible. Some vegetation will be lost along the frontage to the residential edge.</p>	<p>The palm trees and planting within the roundabout will be lost but the palms will be relocated to a suitable location.</p> <p>Over mature trees (Camphor Laurels) east of Samuel Street will be removed and replaced with a suitable tree species in accordance with Council's preferred street tree species list. Memorial plantings are also proposed for the area.</p>
<p>Chainage 2680: VP24 Looking south along Samuel Street towards Mona Vale Road.</p>	<p>The signalised intersection with Mona Vale Road resulting in the removal of the roundabout and roundabout plantings.</p>	<p>Provide low shrubs to adjacent verges where space allows in areas disturbed during construction activities.</p>

Location	Issue	Mitigation
<p>Chainage 2680: VP25 Looking south along Samuel Street towards Mona Vale Road.</p>	<p>The signalised intersection with Mona Vale Road. Localised widening to the end of Samuel Street. The removal of the roundabout and roundabout plantings.</p>	<p>Provide low shrubs to adjacent verges where space allows disturbed during construction activities.</p>
<p>Chainage 2680: VP26 Looking north along Ponderosa Parade towards Mona Vale Road.</p>	<p>The signalised intersection with Mona Vale Road. Localised widening to the end of Samuel Street. The removal of the roundabout and roundabout plantings.</p>	<p>Provide low shrubs to adjacent verges where space allows disturbed during construction activities.</p>

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8.0 Conclusion

Mona Vale Road provides a major east/west link between Pittwater Road at Mona Vale and the Pacific Highway at Pymble. Mona Vale Road is a strategic route for the suburban, commercial and industrial areas of the Northern Beaches. The majority of Mona Vale Road has been upgraded to either four lanes (two lanes in each direction) or six lanes (three lanes in each direction). However two sections of Mona Vale Road are currently two lanes (one lane in each direction). These sections of Mona Vale Road link the communities of Terrey Hills, Ingleside and Mona Vale and the adjoining suburbs of Eleanora Heights and Warriewood. The corridor passes through the two Local Government Areas of Warringah Council and Pittwater Council. With high and increasing volumes of traffic using the arterial road these sections experience traffic congestion, significant traffic delays and have a high crash history including a number of recent fatalities. The road is also used by recreational cyclists.

This report assesses the proposed works associated with the Eastern Section of the Mona Vale Road Upgrade: the widening and improvement of 3.2kms of Mona Vale Road from Manor Road/ Lane Cove Road, Ingleside to Foley Street, Mona Vale. The Mona Vale Road East section runs along and down the Warriewood escarpment from Manor Road east of Powder Works Road to the junction of Foley Street and Mona Vale Road. At its eastern end the road's setting is more urbanised. It is characterised by adjacent residential development, light industry, commercial land uses, recreational areas and the Mona Vale General Cemetery. Further west, the proposal area lies primarily in a bushland setting, with Katandra Bushland Sanctuary on the northern side of Mona Vale Road and part of Ingleside Chase Reserve on the southern side. The proposal area is within the Narrabeen Lagoon Catchment and several drainage lines flow beneath Mona Vale Road in a south-easterly direction, Narrabeen Creek being the most prominent.

An analysis of the existing character of the Mona Vale Road East corridor was carried out to provide a baseline for assessing the significance of likely changes resulting from the upgrade. The analysis involved identification of eight landscape character zones. The landscape character zones vary widely and include such features as the bushland environments of the Ingleside Plateau & Warriewood Escarpment with occasional long distant views of the Pacific Ocean and coastline to the south and east; the industrial/commercial/retail zones associated with the Mona Vale commercial precinct; the Mona Vale cemetery and Mona Vale residential areas. Each of the landscape character zones have been described in detail and their sensitivity to physical and visual change assessed.

In summary, Zones 3 and 4 (Ingleside Plateau and Warriewood Escarpment) have been assessed as having a moderate to moderate-high level of sensitivity. Zones 7 and 8 (Warriewood Residential and Warriewood Cemetery) are ranked as having a moderate level of sensitivity. Zone 5 (Lower Escarpment and Future Residential) is judged as having a moderate-low level and Zones 1, 2 and 6 (Ingleside Residential, Ingleside Valley and Mona Vale Commercial) have been assessed as having a low degree of sensitivity.

The Visual Impact Assessment is based on a Visual Envelope Map, which captures the areas from which the proposal can be seen. It includes the 30 individual viewpoint locations from which visual impact has been assessed. The ranking of visual impact from each view viewpoint is a product of the visual sensitivity of the location and the magnitude of the proposal as seen from that location. These visual impacts are scored from low to high.

In summary, seven viewpoints have been assessed as experiencing a moderate to high degree of visual impact. The remainder of the viewpoints are ranked as moderate (9), moderate-low (10) and low (4). In part, these impact rankings reflect the diversity of the study area. The western section of the Mona Vale East upgrade traverses a rugged bushland setting with characteristic sandstone cuttings immediately adjacent to the road. It also provides occasional views to the coastline and Pacific Ocean. The eastern section, on the other hand, is largely urban in character. The sensitivities here are associated with the heritage listed cemetery and the removal of over mature camphor laurels adjacent to the Mona Vale residential edge.

The Visual Impact Assessment process brings to light the need for a range of mitigation measures to reduce the road's visual impact and make it more compatible with its surroundings. Mitigation recommendations include:

- + Re-use of cut sandstone material where feasible in the construction of retaining walls or as wall or abutment cladding.
- + Revegetation of disturbed areas during construction activities using locally appropriate and endemic trees and shrubs.
- + New or additional landscaping to screen traffic from neighbouring residences.
- + The creation of an entry avenue as a gateway to the Mona Vale Township
- + Planting to embankments and in front of retaining walls to reduce the visibility of landforms and structures from residential areas.

To inform the concept design, six urban design objectives are identified for the Mona Vale Road Upgrades. Under each of these general objectives a series of principles are then articulated that apply to both the Mona Vale Road East and West Upgrades. The overall corridor concept design has been informed by these governing objectives and principles. This concept adopts the outlined mitigation recommendations and integrates them into a coherent urban and landscape composition. The corridor concept design plans are supplemented by concept sections and artist impressions of the typical treatment for retaining walls and also the streetscape at the entry to Mona Vale.

In conclusion, the methodology followed in this study seeks to reveal the likely impact of the road widening and upgrade in this relatively sensitive environment. It demonstrates that the application of a clear urban and landscape design strategy can improve the functional and aesthetic outcomes of the project. Specifically, the study proposes a site responsive design approach that looks at the range of conditions along the route and what are the most appropriate treatments given the variable context. The resultant concept design is largely landscape driven and most of the mitigation measures adopted concentrate on the nature and extent of planting in any given location. The proposed retaining walls are explicitly inspired by the sandstone cuttings that are already a defining characteristic of the Mona Vale Road route. Similarly, the new or widened cuttings which figure prominently, especially in the Mona Vale Road East Upgrade, are planned to be relatively steep to heighten the immersive experience of the sandstone landscape. As the road approaches Mona Vale, the roadside landscape design adopts a degree of formality to mark the entrance to the town and to relate to adjacent land uses such as the Mona Vale Cemetery.

Of course further opportunities for mitigation of impacts and refinement of design and planting ideas may arise through future consultation with landowners and as the road design evolves. In any case, this Landscape Character, Visual Impact Assessment and Urban Design Study anticipates a built outcome that is attractive and functional with generally modest impacts on its surroundings: a road corridor that provides an efficient and safe travel experience and one that capitalises on the dramatic landscape of the route without seriously affecting that landscape or the amenity of local people.

Appendix A: Glossary

Landscape	A tract of land. Taken to mean a prospect or piece of scenery or land. Landscape includes buildings, villages, towns, cities and infrastructure. The term is also used as shorthand for vegetation either planted, seeded or existing.
Landscape Character	The aggregate of built, natural and cultural aspects that make up an area and provide its unique sense of place. Landscape in this context is taken to include all aspects of a tract of land - the built, planted and natural topographical and ecological features.
Landscape Character Zone	An area of the landscape with similar properties or strongly defined spatial qualities.
Magnitude	The scale, form and character of a development proposal. Combined with sensitivity, magnitude provides a measurement of impact.
Sensitivity	<p>The sensitivity of a landscape character zone or view and its capacity to absorb change. Combined with magnitude, sensitivity provides a measurement of impact. Four factors determine sensitivity:</p> <ul style="list-style-type: none"> + The extent to which the landscape is pristine or modified + Its coherence or variability + The number of viewers and frequency of view + The distance the viewers are from the proposed development
Urban Design	Urban design in the Roads and Maritime Services' context is the process where proposals are designed so that they: fit sensitivity with the built natural and community environment contribute to the functioning of the community and contribute to the quality of the public domain for the community and road users. Architects, engineers, environmental experts, landscape architects, planners and urban designers are all practitioners in the process of urban design. Urban designers are generally landscape architects and architects that have extended their expertise into the field of urban design.
VEM	Visual Envelope Map also referred to as 'viewshed', 'visual catchment' or 'zone of visual influence'. It is the area within which a proposal can be seen at eye level above ground.
Visual Impact	The impacts on the views from residences and key publicly accessible locations.

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Appendix B: References

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